CERAMIC ABSTRACTS and THE BULLETIN

OF THE

AMERICAN CERAMIC SOCIETY

NOVEMBER 15, 1945

MONTHLY PUBLICATION DEVOTED TO THE ARTS AND SCIENCES RELATED TO THE SILICATE INDUSTRIES

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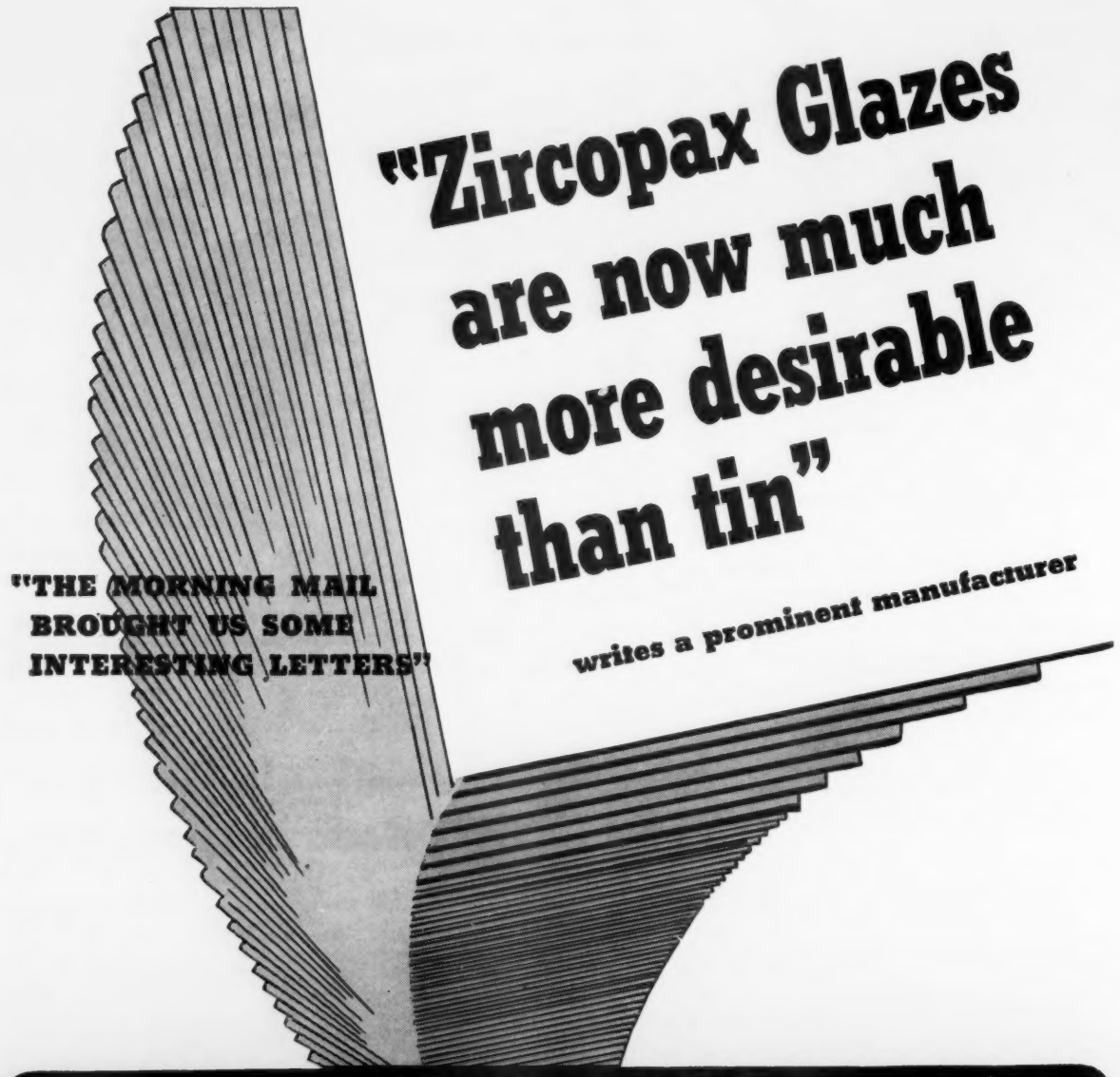

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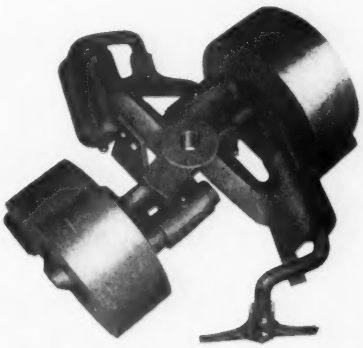

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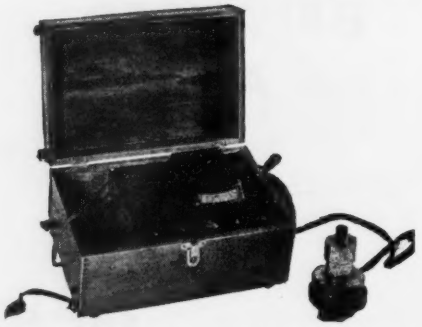

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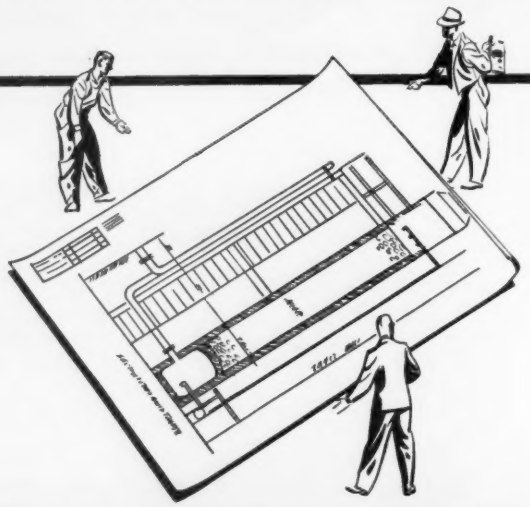

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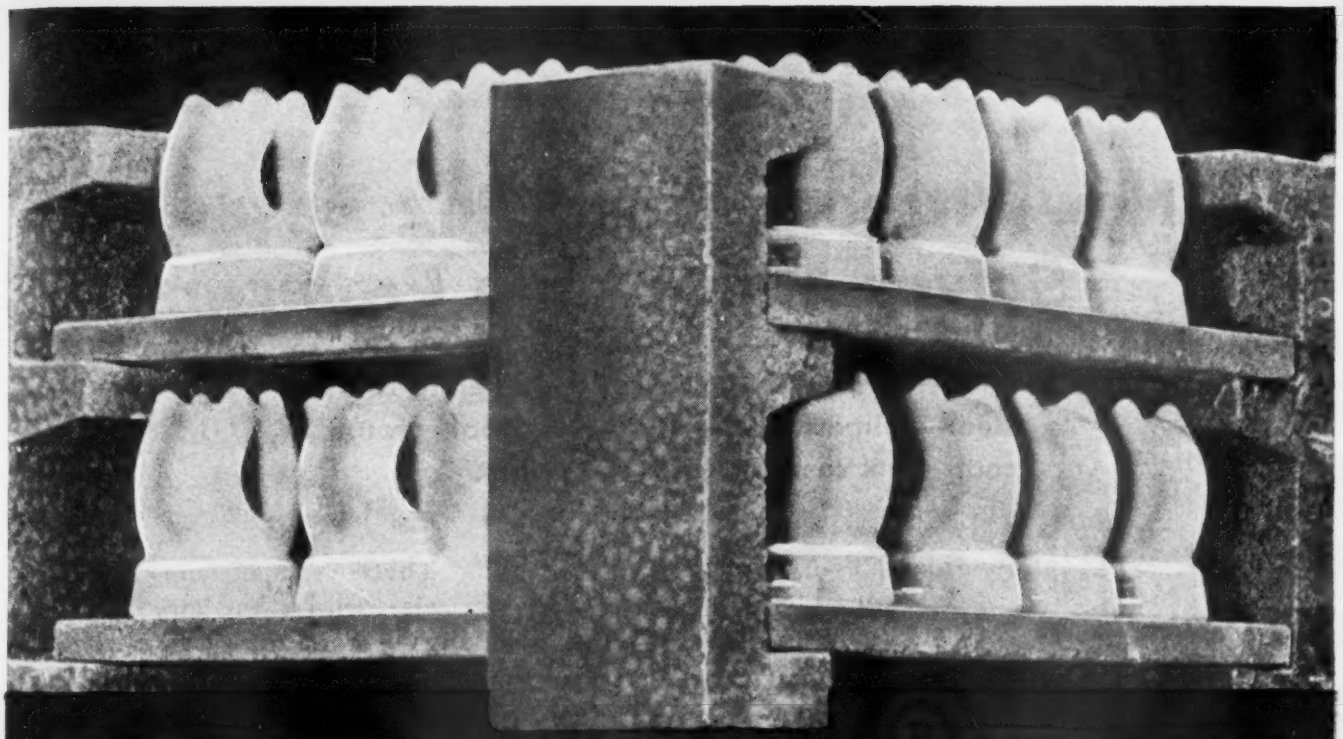

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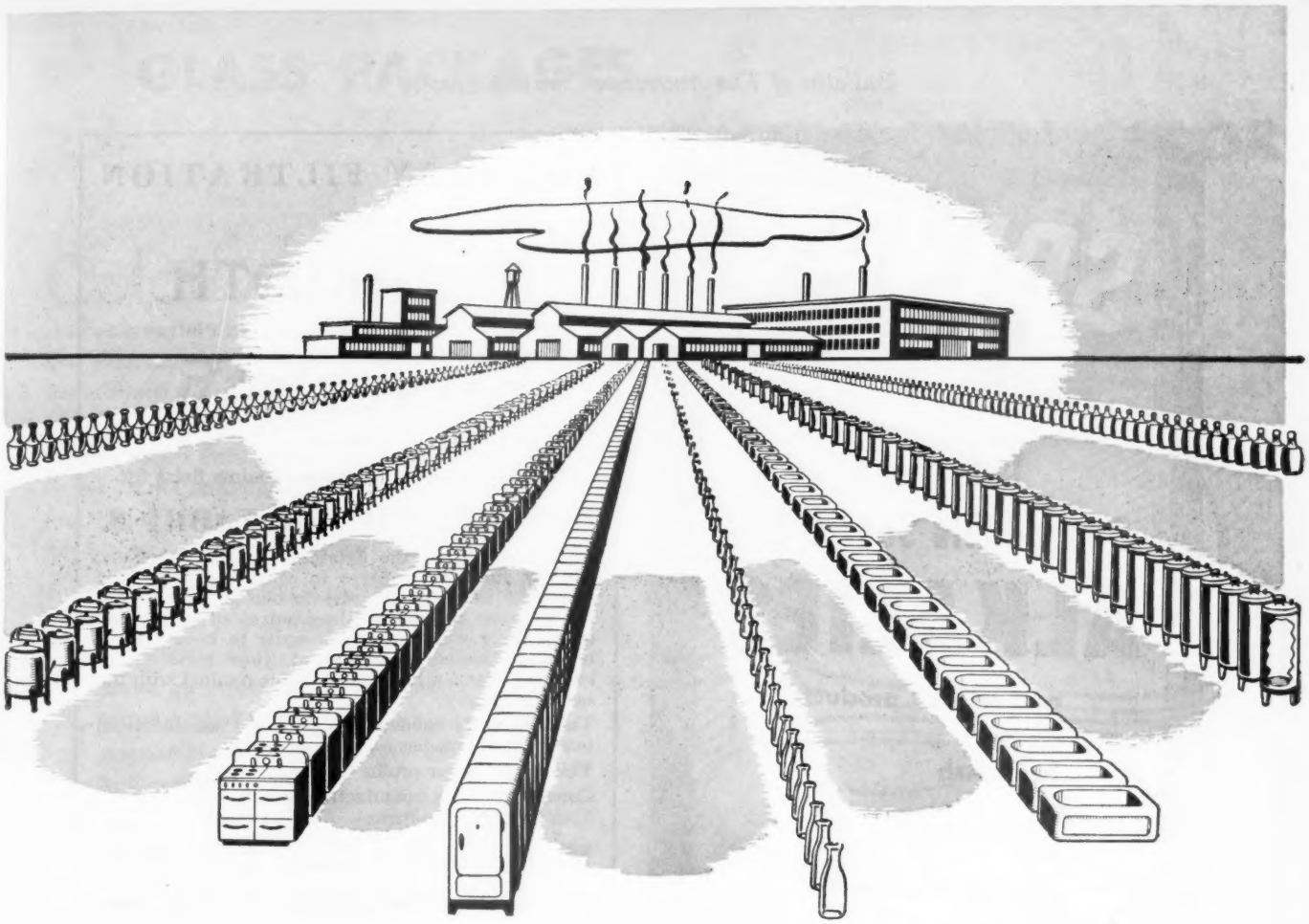

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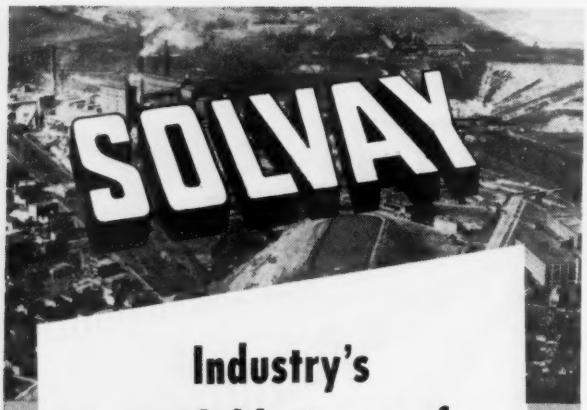

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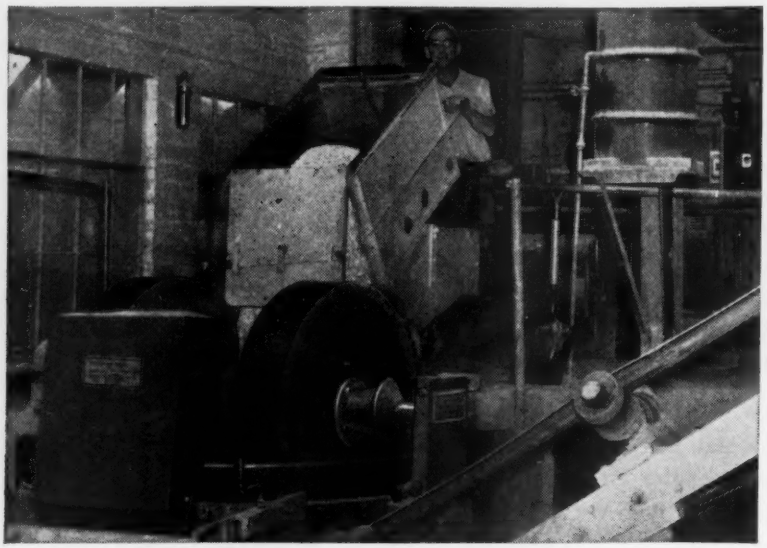

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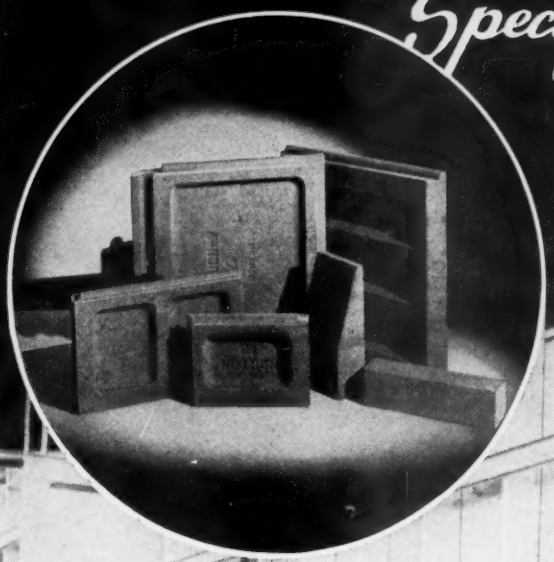

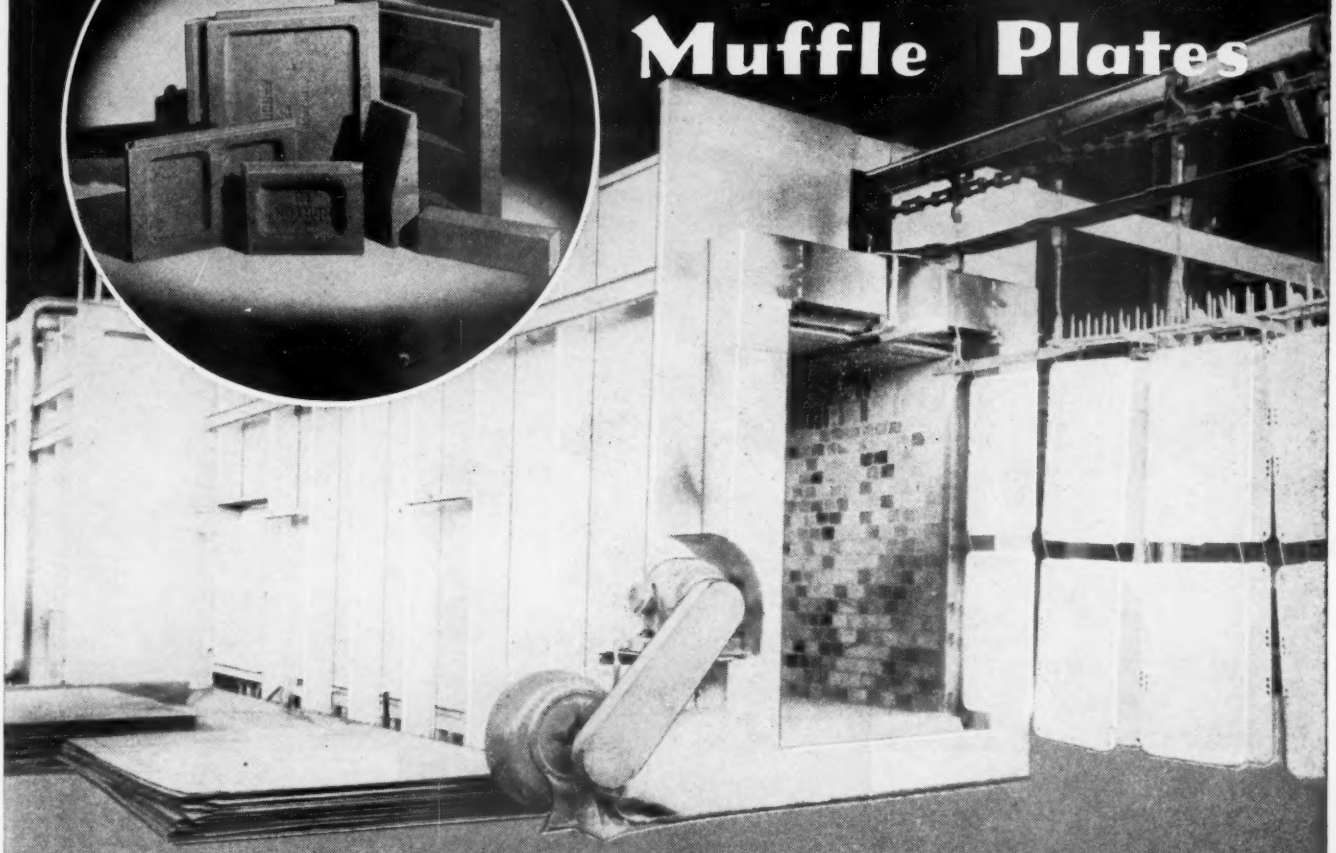

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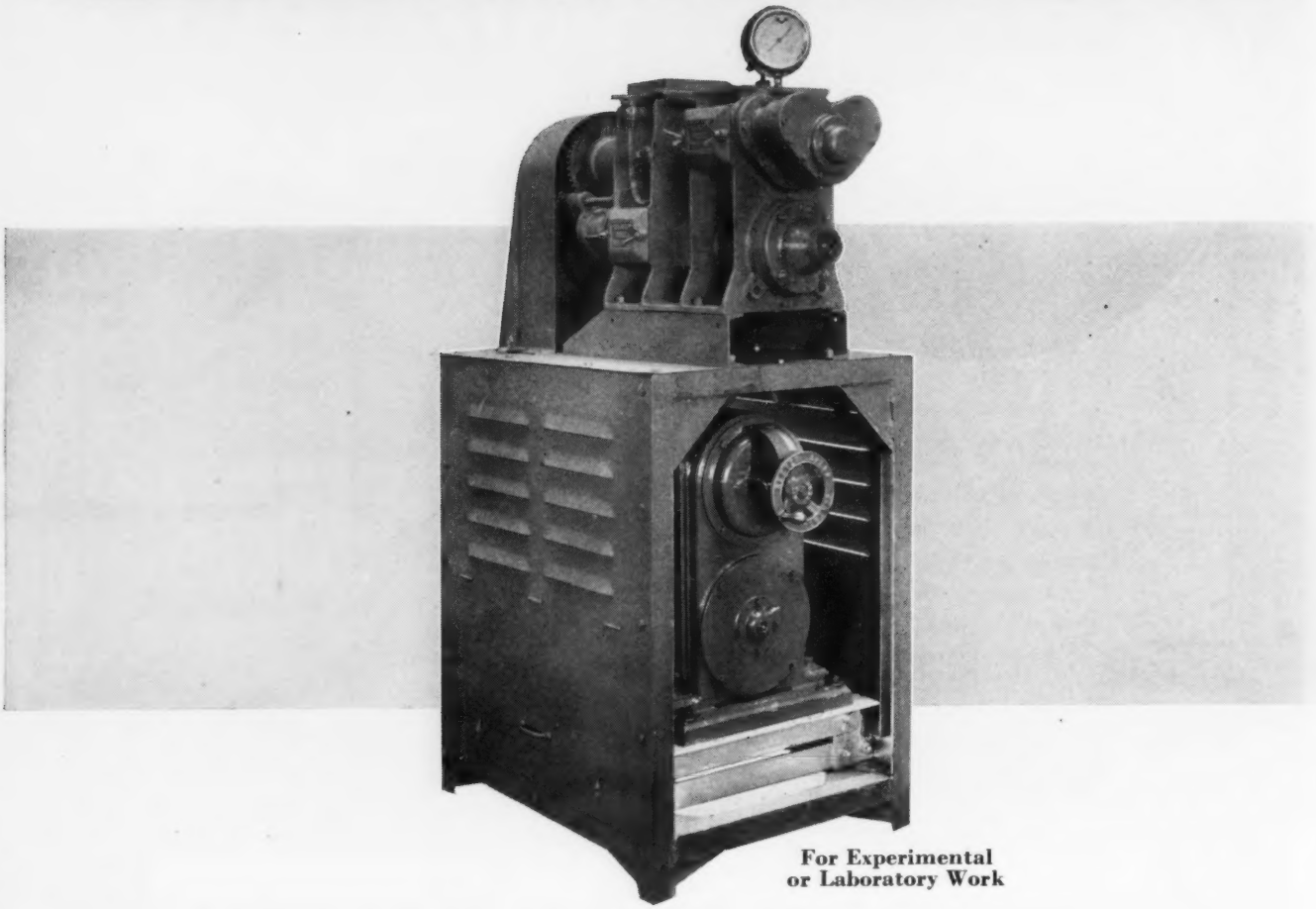

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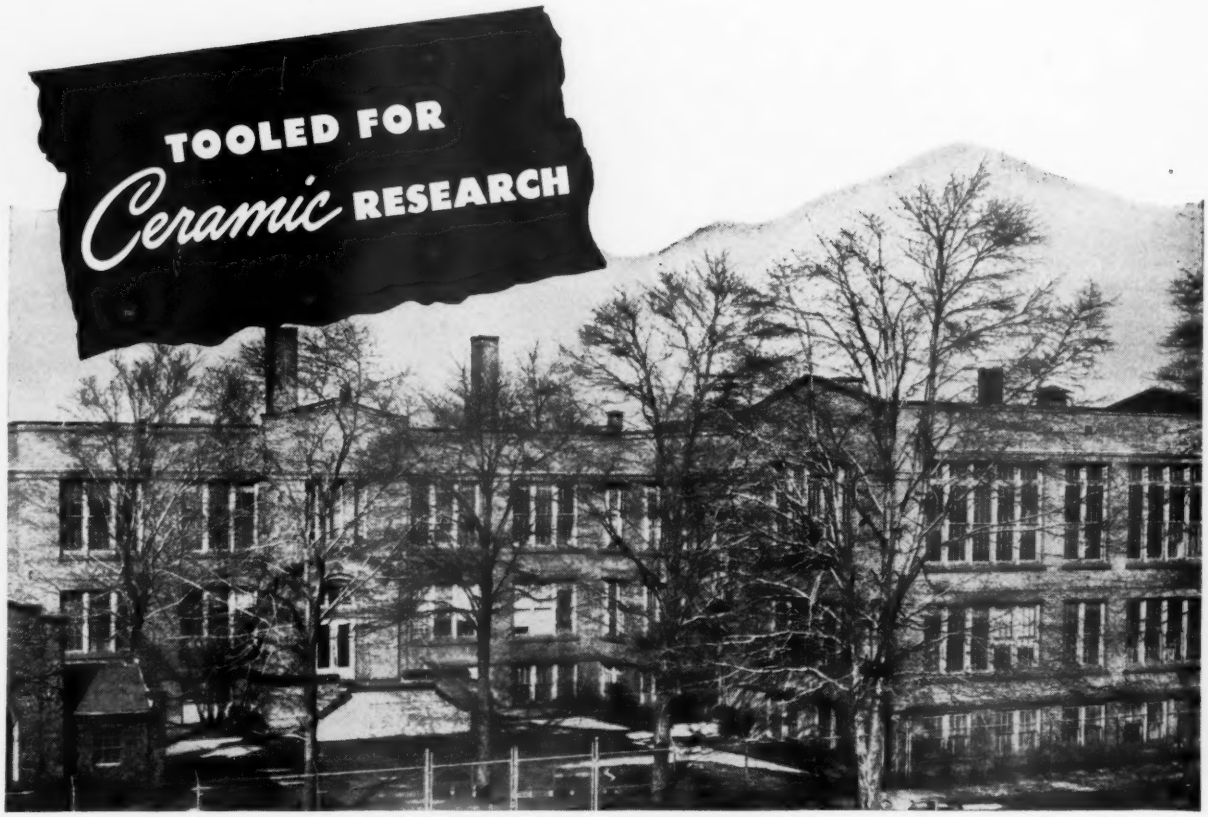

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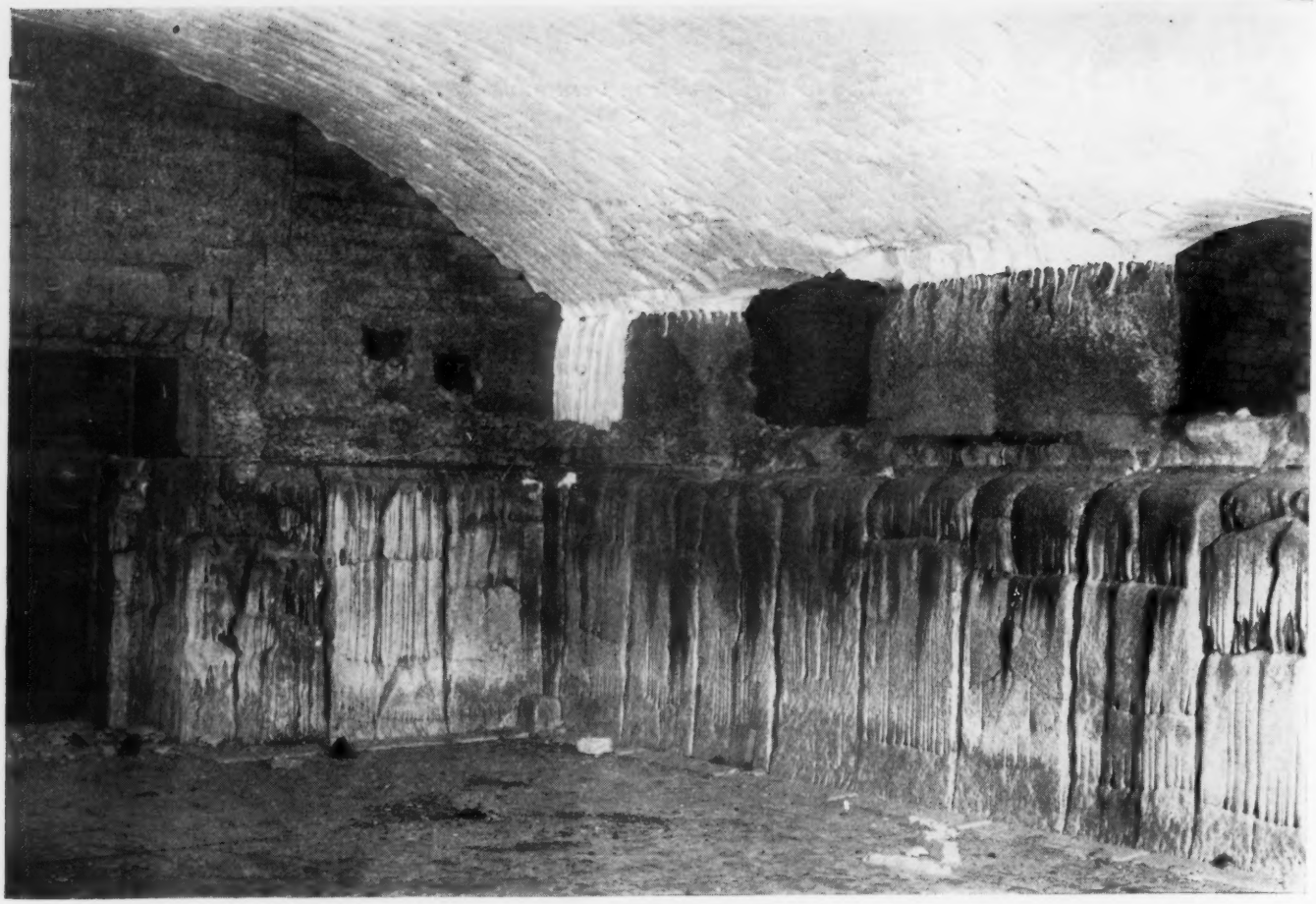

ANOTHER "THREE-YEAR" CORHART* ELECTROCAST TANK

A LITTLE over three years ago we published the story and operating data for a Corhart* flint-glass tank that had just finished a run of practically three years.

Today we are glad to report the results of that tank's successor—another "three-year" campaign just recently ended in which the melting and refining-end sidewalls, throat, doghouse and complete refining bottom of this unit were constructed with Corhart* Electrocast materials.

TOTAL DAYS	1,042
OPERATING DAYS	849
IDLE DAYS	193
MELTING AREA (SQ. FT.)	993
TOTAL TONS GLASS	141,029
CULLET RATIO	64.1%
TONS GLASS PER OPERATING DAY	166.1
TONS GLASS PER TOTAL DAYS	135.3
SQ. FT. PER TON PER TOTAL DAYS	7.3
SQ. FT. PER TON PER OPERATING DAY	6.0
TONS PER SQ. FT. PER LIFE	142

As we have said many times in the past, good production records are the result of good operation plus good refractories. Corhart* is glad to have had the opportunity of playing a part in this excellent performance.

*Not a product, but a registered trade-mark.

QUALITY ECONOMY ENDURANCE

CORHART ELECTROCAST REFRACTORIES

Ceramic Abstracts Section

Compiled by

THE AMERICAN CERAMIC SOCIETY

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PERIODICAL REFERENCE: The name of the periodical appears in italics, followed by the volume (bold-faced), issue number (in brackets), page numbers, and year (in parentheses).

Vol. 24 **November 15, 1945** **No. 11**

Abrasives

Abrasive wheel dresser. ANON. *New Equipment Digest*, **10** [9] 13 (1945).—A long life, fast operating, diamond wheel dressing tool is described. It is made by Industrial Abrasives, Inc., Diamond Wheel Div., Chicago 32, Ill. F.C.A.

Cemented-carbide ways increase accuracy of tool grinder. J. R. LONGWELL. *Amer. Machinist*, **89** [19] 118–19 (1945).—Cast-iron dovetail slides and ways in a Wickman grinder were replaced by cemented-carbide members. The precision of profile grinding was increased considerably over longer periods. M.HA.

Centerless grinding in mass production. W. HANDEL. *Werkstattstech./Betrieb*, **37/22,** 149–52 (1943).—H. reviews centerless grinding, including longitudinal and infeed grinding. The subdivision of operation and special attachments are also discussed. 16 figs. P.G.

Circular table grinding machine for the tool room. ANON. *Werkstattstech./Betrieb*, **38/23,** 57 (1944).—The attendance, setting, and drive of the grinding machine are discussed. The most important application is surface grinding of milling cutters, sawing blades, dies, etc. The specifications are as follows: largest wheel diameter, 550 mm.; speeds of magnet table, 18, 24, or 30 r.p.m.; motor for table drive, 0.75 h.p.; speed of grinding spindle, 1450 r.p.m.; grinding motor, 7.5 h.p. 1 fig. P.G.

Crystal structure of α-SiC, type VI. LEWIS S. RAMSDELL. *Amer. Mineralogist*, **30,** 519–25 (1945).—A structure has been determined for α-SiC, type VI, one of the new modifications of SiC recently reported by Thibault. He found the rhombohedral unit cell to contain 11 SiC, with the dimensions a_{rh} = 27.704 a.u. and α = 6° 21.5′. Space group $R3m$. Referred to hexagonal axes, the unit cell contains 33 SiC with a = 3.073 a.u. and c = 82.94 a.u. The atomic positions are given in the original. 4 references, 3 figs. See *Ceram. Abs.*, **24** [3] 49 (1945). W.D.F.

Determination and significance of chip thickness in grinding. G. PAHLITZSCH AND H. HELMERDING. *Werkstattstech./Betrieb*, **37/22,** 397–99 (1943).—Formulas are given for computing the thickness of chips in grinding. How the ideal thickness of the grinding chip characterizes the grinding condition remains the chief problem, and this can be solved only by actual tests. 10 references, 5 nomographs. P.G.

Dust collectors for grinders and similar units use compressed air. ANON. *Chem. Preview*, **8** [1] 82 (1945).—A unit manufactured by the Whiting Corp., Harvey, Ill., uses compressed air to aspirate dust from the grinder hood to the collector, where it is mixed with water and settles as sludge. The water is removed from the sludge and recirculated. Filters and exhaust fans are eliminated. J.F.H.

Essex centerless grinder. ANON. *Ind. Diamond Rev.*, **5** [58] 200 (1945).—The machine is manufactured by the Motor & Engineering Co., Ltd., and sold by E. H. Jones (Machine Tools), Ltd. The adjustable diamond holder is fitted to a screw-operated slide at the rear of the grinding wheel. The grinding-wheel guard has a shutter that is opened for the truing operation, which is carried out in the usual way by taking a series of light cuts and using a copious flow of coolant. The control wheel is trued by the grinding wheel. 1 illustration. P.G.

Form grinding in tool grinding. K. LUEDTKE. *Werkstattstech./Betrieb*, **37/22,** 185–88 (1943).—L. discusses auxiliary means for the production of pressing and punching tools as well as turning tools. The comparative life of grinding wheels, profile grinding of turning tools, grinding dies for bending tools, and ground die plates are mentioned. 15 figs. P.G.

Glossary of technical terms used in the diamond industry. W. J. SANSOM, in collaboration with the technical staff of *Industrial Diamond Review*. *Ind. Diamond Rev.*, **5** [58] 202–207 (1945); IDR Data Sheet and Pin-up Page, No. 14.—Two hundred technical terms and their explanations give a complete survey of the industry, covering production, mineralogical, and ornamental terms and the applicability of the stones. The American and English versions are given. P.G.

New external grinder for straight teeth flank. E. WACKER. *Werkstattstech./Betrieb*, **38/23,** 89–90 (1944).—The machine has two grinding wheels. The truing tool operates according to the rolling principle. Uusally, in a special housing, three diamonds are employed, two for each flank and the third for the external diameter.

By this arrangement both wheels are trued simultaneously. The diamonds are adjusted to high accuracy by optical means. The working principle and the main dimensions of the machine are given. Grinding time for a wheel with 54 teeth, module 5.35 mm., pressure angle 20°, 75 mm. width of EC 100 carburized and hardened, and grinding allowance 0.18 mm. is only 36 min. instead of hitherto 340 min. High accuracy and surface finish are obtained. 7 figs.
P.G.

Standard grinding head for surface grinding. C. KRUG. *Werkstattstech./Betrieb*, **38/23,** 89 (1944).—A grinding head has been standardized by the Committee for Grinding Machines for diameters between 8 in. and 64 in. containing 6 to 20 segments. Only three segment sizes are standardized: 100 x 60 x 20, 160 x 120 x 32, and 250 x 180 x 50 mm. The tolerances are for length ±0.5 mm., for width ±0.3 mm., and for thickness ±0.2 mm. The design is simple and safe and allows easy readjustment and exchange of grinding segments of simple prismatic form. 1 fig.
P.G.

PATENTS

Abrasive article and method of manufacturing. P. H. RHODES (Pennsylvania Coal Products Co.). U. S. 2,385,371, Sept. 25, 1945 (Nov. 13, 1941). 16 claims. Cl. 51-298.—1. The method of manufacturing abrasive articles comprising mixing a mass of abrasive particles with a heat-hardenable adherable mixture of a dihydroxy benzene-aldehyde resin and a methylene-containing setting and hardening agent in a quantity to harden the resin and curing the mixture of the abrasive particles and the resin mixture at a temperature varying from 80° to 125°C. whereby the resin is converted into a hard infusible insoluble cementing medium cementing the abrasive particles together.

Abrasive compositions. R. S. DANIELS AND A. J. MOSTELLO (Bakelite Corp.). U. S. 2,385,776, Oct. 2, 1945 (Feb. 21, 1942). 8 claims. Cl. 51-298.—1. Abrasive article comprising abrasive grains and a bonding agent for the grains comprising essentially the reaction product of a diolefine adduct of a conjugated unsaturated dibasic acid and a member of the group consisting of polyhydric alcohols and polyalkylol amines.

Apparatus for applying elongated particles such as abrasives to webs. CARBORUNDUM CO. Brit. 571,537, Sept. 12, 1945 (May 9, 1942).

Buffing and polishing wheel. B. C. CASE (Hanson-Van Winkle-Munning Co.). U. S. 2,384,599, Sept. 11, 1945 (Aug. 13, 1942). 4 claims. Cl. 51-193.

Grinding device. L. M. HOLTZ. U. S. 2,384,917, Sept. 18, 1945 (Aug. 30, 1944). 5 claims. Cl. 51-259.

Grinding machine. R. H. CRAMER (General Motors Corp.). U. S. 2,386,382, Oct. 9, 1945 (May 20, 1942); divided out of U. S. 2,311,213, Feb. 16, 1943 (July 30, 1940). 16 claims. Cl. 51-165. A. B. MACNEILL. U. S. 2,386,742, Oct. 9, 1945 (Dec. 30, 1944). 2 claims. Cl. 51-108.

Grinding wheels. S. S. KISTLER (Norton Co.). U. S. 2,384,683, Sept. 11, 1945 (May 31, 1940). 14 claims. Cl. 51-298.—1. An abrasive product comprising abrasive grains bonded with sulfur-vulcanized butadiene copolymerized with another compound selected from the group consisting of vinyl and methyl vinyl compounds.

Grinding wheels. S. S. KISTLER (Norton Co.). U. S. 2,384,684, Sept. 11, 1945 (May 31, 1940; Oct. 13, 1942). 6 claims. Cl. 51-299.—1. An abrasive product comprising abrasive grains distributed throughout and adhered and held together by a bond that comprises the vulcanized reaction product with sulfur as a vulcanizing agent of a mixture of a butadiene compound selected from the group consisting of (1) butadiene polymer and (2) butadiene copolymer comprising butadiene copolymerized with a vinyl compound, and unvulcanized natural rubber initially present in an amount to overcome, during working, the characteristic of the butadiene compound in resisting envelopment of and adhesion to the abrasive grains and thereby to contribute grain-retentive plasticity thereto, whereby the bond effected by the aforesaid vulcanized reaction product substantially uniformly envelops and securely holds the abrasive grains.

High-speed grinding spindle. J. C. STAFFORD. U. S. 2,386,639, Oct. 9, 1945 (Jan. 5, 1943). 2 claims. Cl. 308-76.

Machine for grinding bits. FATE DIXON (1/2 to A. L. Walton). U. S. 2,384,899, Sept. 18, 1945 (Feb. 23, 1944). 5 claims. Cl. 51-219.

Manufacture of synthetic rubberlike materials and abrasive articles embodying such materials. UNITED STATES RUBBER CO. Brit. 571,457, Sept. 5, 1945 (Feb. 24, 1943).

Material of boron carbide and diamond. ELEKTROSCHMELZWERK KEMPTEN AKT.-GES. Ital. 388,633, Nov. 22, 1940; abstracted in *Chem. Zentr.*, **1943, I** [4] 436.—A mixture of fine-grained B_6C and diamond powder or splinters is heated, preferably under pressure and in a neutral atmosphere, to beginning of sintering. The shapes so obtained can be used as grinding agents, machine parts, etc., or they can be comminuted and then used as grinding substances. M.HA.

Piston-ring grinder. R. F. FLORA (Clover Foundry Co.). U. S. 2,385,979, Oct. 2, 1945 (Sept. 16, 1942). 5 claims. Cl. 51-129.

Process and machine for grinding toothed gears. ALFRED RICKENMANN. U. S. 2,385,650, Sept. 25, 1945 (May 22, 1944; in Switzerland Jan. 28, 1944). 8 claims. Cl. 51-71.

Profile grinding machines. BENTLEY ENGINEERING CO., LTD., AND I. TWIGGER. Brit. 571,134, Aug. 22, 1945 (Jan. 19, 1944).

Workpiece-feeding devices for centerless grinding and like machines. A. SCRIVENER, LTD., AND A. SCRIVENER. Brit. 571,650, Sept. 12, 1945 (Feb. 24, 1944).

Work plates for centerless grinding machines. W. JESSOP & SONS, LTD., AND J. G. LAMBERT. Brit. 571,043, Aug. 15, 1945 (March 28, 1944).

Art and Archeology

Flinders Petrie: the scientific classification of archeological material. S. R. K. GLANVILLE. *Proc. Roy. Inst. Gt. Brit.*, **32,** Part 2 [148] 344–59 (1942).—The work of the famous Egyptologist is described. Petrie attacked the violent methods of Belzoni and his successors (whose aim was usually to recover monumental pieces by any means) and may be considered as the founder of systematic excavation in Egypt. His careful attention to the ages of pottery and brick gave chronological scales for the periods of occupation of ancient cities and other sites, and by his exceptional knowledge of the archeology of the Mediterranean area, he was able to work out valuable correlation data. Petrie never overlooked the significance of ceramic objects, e.g., fragments of pottery, beads, etc., and may be said to have maintained that in archeological excavation the sieve is mightier than the shovel. L.C.C.

BOOK

Ceramic Arts. WILLIAM H. JOHNSON AND LOUIS V. NEWKIRK. Macmillan Co., New York, 1942. 158 pp. Price $1.20.—This text, for use in the Chicago public schools and elsewhere for students in junior high school classifications, was written to inform young students of the scope and application of the ceramic arts and industries. Johnson, Ph.D., is Superintendent of the Chicago Public Schools, and Newkirk, Ph.D., is Director of the Bureau of Industrial Arts Education, Chicago Public Schools. Although the title is "The Ceramic Arts," three chapters deal with avocational and vocational methods of producing pottery, and one chapter each is devoted to avocational methods and uses of resin plastics, glass, alabaster, cement, and concrete. Full-page illustrations from Lenox, Inc., show professional methods of forming pottery and decorat-

ing it, and the illustrations for the glass section were supplied by Corning Glass Works and others. Excellent, clear drawings illustrate the avocational portions of the text. The other chapters are illustrated by photographs furnished by interested manufacturers, in addition to the drawings. The opening sentence in Chapter 1 is as follows: "The ceramic industries, producing or using pottery, plastics, glass, alabaster, and cement, have contributed much toward improving the standards of living." In so excellently planned a textbook, it is regrettable that young persons are misinformed concerning the scope of the ceramic industries and the definitions of them. PAUL E. COX

PATENTS

Application of ceramic transfers or prints to pottery, etc. W. BOULTON, LTD., AND R. T. LEWIS. Brit. 571,548, Sept. 12, 1945 (Feb. 9, 1945).

Casting powder enamel. AUERGES. A.-G. (Johannes Löffler, inventor). Ger. 724,688, Sept. 4, 1942 (June 14, 1939); cl. 48*c;* abstracted in *Chem. Zentr.*, **1943, I** [7] 771; supplement to Ger. 721,420.—The B_2O_3 content given in the principal patent is replaced by P_2O_5 to such extent that a content of only 2% B_2O_3 remains in the molten enamel. Example: 4.8 borax, 44.9 $Na_2HPO_4 \cdot 12H_2O$, 18.8 feldspar, 7.5 MgO, 13 ZnO, 1.6 sodium saltpeter, and 11.0 Zr silicate. M.HA.

Manufacture of strong, firmly adhering, silver-containing layers on ceramic bodies. STEATIT-MAGNESIA A.-G. (Erich Funcke and Hermann Höppli, inventors). Ger. 730,221, Jan. 8, 1943 (Nov. 23, 1940); cl. 80*b;* abstracted in *Chem. Zentr.*, **1943, I** [13] 1403.—On the surfaces of the ceramic body that have been silvered by the known burn-in method, silver amalgam is deposited in corresponding thickness and, after hardening, is subjected to a heat-treatment. A silver amalgam of 0.9 part (by weight) Hg and 1 Ag can be used, which, after hardening for 24 hr., is heated for 1 to 5 hr. to 90 to 95°C. M.HA.

Protective coating for silver or gold deposits on glass, enamels, or other transparent material. SÉBASTIEN-ÉDOUARD LEMPEREUR. Fr. 872,659, June 16, 1942 (May 7, 1941); abstracted in *Chem. Zentr.*, **1943, I** [5] 555.—The protection consists in a coat of, e.g., calcium caseinate which, at the same time, absorbs the small amounts of Na in the silver deposit. After drying, a layer of a lacquer, resin, or insulating material is put on this coat. M.HA.

Cements

A normal setting of artificial Portland cement. PAULINO SAVIRÓN CARAVANTES. *Cemento* [Barcelona], **10,** 2–6, 31–34, 78–82 (1942); abstracted in *Chem. Zentr.*, **1943, I** [1] 76.—The role of alkalis in the setting process is discussed, and comparative experiments are described on the effect of CO_2 and of air saturated at 13°C. with water on cement to which $KNaCO_3$ has been added or on clinkers containing much alkali. In both cases, setting was accelerated by the change in atmosphere; this became still more pronounced by treatment with steam under pressure, about 2 atm., for 15 min. An addition of $Na_2CO_3 \cdot 10H_2O$ has the same effect. M.HA.

New aspect of creep in concrete and its application to design. DOUGLAS MCHENRY. *Proc. Amer. Soc. Testing Materials,* **43,** 1069–87 (1943).—The following creep equation is suggested: $Q = \alpha(1 - e^{-rt}) + \beta e^{-pK}(1 - e^{-mt})$, where Q = creep due to unit load, K = age at time of loading, t = time after loading, and $\alpha, \beta, r, p,$ and m = constants determined from laboratory tests. Numerous laboratory tests that form the basis and verification of the treatment are described. Discussion. 7 references. W.R.B.

Notes on the effect of akalis in Portland cement on the durability of concrete. R. F. BLANKS, W. C. HANNA, BAILEY TREMPER, C. E. WUERPEL, AND F. H. JACKSON. *Proc. Amer. Soc. Testing Materials,* **43,** 199–220 (1943).—26 references. W.R.B.

Powdered aluminum as an admixture to concrete. R. W. CARLSON. *Proc. Amer. Soc. Testing Materials,* **42,** 808–20 (1942).—The mixing of powdered aluminum metal with normal-weight concretes puffs them almost imperceptibly due to hydrogen formation. Such concretes exhibit increased resistance to freezing and thawing in calcium chloride, improved bond strength to steel, and greater flexural strength. The rates of expansion of fresh concretes containing aluminum powder differ for various types of aluminum and for cements of various alkali contents. Discussion. W.R.B.

Studies to develop an accelerated test procedure for the detection of adversely reactive cement-aggregate combinations. T. E. STANTON. *Proc. Amer. Soc. Testing Materials,* **43,** 875–904 (1943).—To determine the potential expansion characteristics due to chemical reaction of any cement-aggregate combination, the following tests were used: (1) chemical analyses of aggregate and cement, (2) mineralogical and petrographic analyses, (3) fluorescence, (4) reaction in combinations with caustic solutions, (5) dynamic (sonic) modulus changes with relation to expansion, (6) cement content, and (7) curing procedure. Best over-all long-time tests were obtained by curing in sealed containers at 70°F. Discussion. W.R.B.

Study of the heat of solution procedure for determining the heat of hydration of Portland cement. LEO SHARTSIS AND EDWIN S. NEWMAN. *Proc. Amer. Soc. Testing Materials,* **43,** 905–16 (1943).—The reproducibility of the method of measuring heats of hydration of Portland cement described in Federal Specification for Cements, Hydraulic, was investigated by the study of data accumulated in routine testing. The temperature coefficients of the heats of solution and hydration of a cement were found to be −0.20 and + 0.1 cal./°C./gm., respectively, in the range 20° to 30°C. Changes in the present procedure for determining the heat of hydration of Portland cement are suggested. 9 references. W.R.B.

Variations in strength of Portland cements conforming to the same specifications and the relation of such variations to concrete control. S. P. WING AND ARTHUR RUETTGERS. *Proc. Amer. Soc. Testing Materials,* **43,** 917–80 (1943).—The findings of three distinct but related investigations, each involving thousands of tests, are presented. Discussion. W.R.B.

Enamel

Antimony- vs. zirconia-opacified enamels. BURNHAM W. KING, JR. *Finish,* **2** [9] 18–20, 54 (1945).—A comparison of the properties of the two types of enamels considers opacity, color, surfaces, working properties of slip, and chemical durability. W.R.B.

California "packaged homes" offer porcelain enamel opportunities. ELSA GIDLOW. *Finish,* **2** [8] 17–18, 50 (1945). W.R.B.

Crazing of enamel on stove tops due to heating in service. ROGER L. FELLOWS. *Jour. Amer. Ceram. Soc.,* **28** [10] 275–81 (1945).—6 references, 7 figures.

Indian enamel industry. M. M. SUR. *Capital,* Jan., 1944; reprinted in *Trans. Indian Ceram. Soc.,* **3** [1] 51–52 (1944).—The two major handicaps to the Indian enamel industry have been (1) lack of knowledge of the practical side of manufacture and (2) Japanese competition. An overdevelopment of the industry in the manufacture of enamel advertising signs brought near extinction, but it was saved by the Safeguarding of Industries Act and Japan's involvement in the China Incident. Since the beginning of the war the industry has flourished, but future expansion of an industry really valuable to the future of

India depends on the policy of the government toward Japanese markets. M.E.P.

Pickling inhibitor. ANON. *New Equipment Digest*, **10** [9] 32 (1945).—Kelite Control, developed by Kelite Products, Inc., Los Angeles, Calif., reduces hydrogen embrittlement and metal attack. F.C.A.

Postwar conditions and the architectural porcelain enamel market. CHARLES P. LOHMAN. *Finish*, **2** [9] 31–33, 52 (1945). W.R.B.

Preopacifiers in boron-free enamels. ANON. *Emailwaren-Ind.*, **19**, 87–88 (1942); abstracted in *Chem. Zentr.*, **1943, I** [2] 197.—Sodium fluoride in quantities up to 2% is recommended, and fluorspar can be added in ample amounts. The opacification can then be regulated with antimony oxide, 2 to 8%, without risking dullness. M.HA.

Psychological survey in homemaking and appliances: I, II. A. B. SWANN. *Finish*, **2** [8] 19–21, 98; [9] 21–24 (1945). W.R.B.

Uncle Sam needs porcelain enamel in time of war. W. N. LYBARGER. *Finish*, **2** [9] 13–16 (1945). W.R.B.

Vitreous porcelain enameling. Suggested Australian institute. F. STANLEY. *Australasian Manuf.*, **30** [1528] 30–32 (1945).—The foundation of an Australian institute of vitreous porcelain enamelers is advocated for the protection and promotion of the enameling industry in Australia. Agenda include the distinction between enamel (paint) and enamel (vitreous porcelain) and cooperation in regard to Australian standards, investigation of new materials and new methods, betterment of quality and appearance of enamelware, betterment of operators' conditions, and the training of operators, supervisors, and salesmen. F.S.

Western Stove Co. builds "tools" for war and plans for postwar. G. C. CLOSE. *Finish*, **2** [8] 13–16 (1945).—A war-production story plus an outline for expanded enameling activity is presented. W.R.B.

What furniture manufacturers and retailers say about porcelain enameled table tops. L. R. ENGLISH. *Finish*, 2 [8] 23–24, 48–49 (1945). W.R.B.

PATENTS

Boron-containing or boron-free enamel. RICKMANN & RAPPE (E. Rickmann and H. Butter, inventors). Swed. 104,671, June 2, 1942 (July 22, 1940); abstracted in *Chem. Zentr.*, **1943, I** [1] 77.—The enamels contain 4 to 5 atomic % F, 11.5 to 16 monovalent and 1.5 to 5.5 bivalent metals, and 27 to 33% by weight Si; the monovalent metals should not exceed 20.5%, the multivalent metals 15%, and their sum 30% by weight. Si can be replaced up to 7% by Zr, Ce, Ti, or pentavalent Sb. The enamels are particularly resistant to chemical attack, in particular boiling HCl. M.HA.

Enamelware making. OSCAR HOMMEL (E. M. Hommel, E. H. Goldstein, and The Union Trust Co., of Pittsburgh, executors, assignors to The O. Hommel Co.). U. S. 2,385,573, Sept. 25, 1945 (July 23, 1941). 5 claims. Cl. 117-70.—1. The refinement herein described of the production of enamelware by spreading successively and drying successively two superposed layers of slip and firing the whole, which consists in including in the composition of the slip of the nether layer a content of 2 to 10% of silicate of soda, whereby blistering in the ultimate firing of the article is prevented.

Manufacture of enameled copper wire. CALLENDER'S CABLE & CONSTRUCTION CO., LTD., P. V. HUNTER, AND G. M. HAMILTON. Brit. 571,638, Sept. 12, 1945 (Jan. 4, 1944).

Glass

Annealing strains in glass and their degree of permanence—measurements of optical retardation over a seven-year period on glass container manufacturers' standardized disks. L. G. GHERING AND T. D. GREEN. *Jour. Amer. Ceram. Soc.*, **28** [10] 288–95 (1945).—6 references, 3 figures.

A.S.T.M. definition of glass. S. R. SCHOLES. *Glass Ind.*, **26** [9] 417, 438 (1945).—The background is given for the procedure and reasoning leading to the recently adopted A.S.T.M. Designation C 162–45T, defining the term "glass." A.P.

Chuck for glass tubing. J. M. SOMERVILLE. *Jour. Sci. Instruments*, **22** [6] 114–15 (1945).—A chuck for holding glass tubing is described which avoids concentrated stress since the grip on the glass is obtained by wrapping steel wires around it, and there is no tendency to break tubing that is bent or not quite circular in section. It can grip tubing whose diameter varies along its length, and it permits quick centering of slightly bent tubes. G.A.K.

Constitution of boron-sodium glasses and the influence of tempering on the constitution. MARC FOEX. *Bull. soc. chim.*, **9**, 382–92 (1942); abstracted in *Chem. Zentr.*, **1943, I** [5] 497–98.—The relations between transformation temperature, viscosity, density, dielectric loss, electrical conductivity, thermal expansion coefficient, refraction, speed of solution, and composition were determined. The formerly postulated existence of the compounds $4B_2O_3 \cdot Na_2O$, $3B_2O_3 \cdot Na_2O$, and $2B_2O_3 \cdot Na_2O$ is confirmed. See "Influence. . . ," this issue, p. 199. M.HA.

Department store uses mirrors to give entire floor "face lifting." ANON. *Amer. Glass Rev.*, **64** [49] 20 (1945).—Tiedke's, Toledo department store, has remodeled a sales floor without making structural changes by using more than 5000 sq. ft. of polished plate glass in mirrors, all-glass display cases, shelf dividers of heat-treated glass, and sliding glass doors on behind-counter cabinets. A.P.

French glass industry, 1940–1945. ANON. *Glass Ind.*, **26** [9] 419–20, 441 (1945).—The present goal of the glass industry of France is to reach 200% of the 1938 production, or one million tons of glass. One billion containers and a half billion square feet of window glass are needed immediately. Obstacles to production include bomb damage to a few factories, fuel shortage, transportation breakdown, abduction of personnel, and deliberate disindustrialization actions by the German occupation forces. A.P.

French glass institute reorganized. ANON. *Glass Ind.* **26** [8] 392 (1945).—L'Institute du Verre, Paris, France, has been incorporated with Bernard Long as Director General. A.P.

Glass and electronics. VIN ZELUFF. *Sci. Amer.*, **173,** 165–67 (1945).—Glass has played a vital role in the development of electronics. Now electronics has been developed to weld glass pipes. Small oxyhydrogen burners preheat the glass over a small area so that the glass is raised to a temperature below the melting point of the glass where it ceases to be an insulator and becomes a high-resistance conductor. The flames now serve as gaseous conductors to direct high-frequency currents that heat the interior of the glass. The material is held in suitable clamps and is pressed together while hot. 4 figs. W.D.F.

Glasses transparent to X rays. ANON. *Glass Ind.*, **26** [8] 373–74, 382, 384 (1945).—Data on beryllium-lithium-boron glasses given by L. Ya. Mazelev (see "System. . . ," *Ceram. Abs.*, **22** [2] 42 (1943)) are compared with the more extensive data of H. Menzel and S. Sliwinski (*Z. Anorg. Allgem. Chem.*, **249** [4] 357–85 (1942)). A.P.

Glenshaw reviews its history on 50th anniversary. ANON. *Glass Ind.*, **26** [9] 425–26 (1945).—Glass was first blown at the Glenshaw Glass Co., Glenshaw, Pa., on January 7, 1895. A series of fires and floods made difficulties in the early years of the company, but courageous and progressive management has led to a stable, successful organization. The company pioneered in machine bottle blowing and mechanical batch mixing. Pride is taken in the labor relations. Its present size is indicated by 400 employees,

operating eleven automatic machines, making more than 170 tons of finished glass, mostly beverage bottles, daily with an annual sales value of three million dollars. Post-war plans call for an additional bottle-making unit consisting of a furnace for five automatic machines, lehrs, raw-material storage, mixing equipment, and a new office building. A.P.

Improved method for detecting casehardened glass as a mirror component. J. J. DIAMOND. *Glass Ind.*, **26** [8] 372, 396 (1945).—A new test for casehardening in mirror glass avoids stripping off the silvering and backing, making it feasible to use the same specimen for the salt-spray test. Polarized light is reflected from the silvered surface with the mirror oriented either parallel or perpendicular to the plane of polarization of the incident light. To observe the edges, the mirror is placed at an angle of 45°. A.P.

Influence of tempering on the speed of solution of glasses of the system B_2O_3–Na_2O in water. MARC FOEX. *Bull. soc. chim.*, **9**, 366–81 (1942); abstracted in *Chem. Zentr.*, **1943, I** [5] 497.—The speed of solution of 29 different glasses, which were fused at 1100°C. and had a composition of 0 to 55 Na_2O, 100 B_2O_3, was investigated in the form of disks 31 mm. in diameter and 5 mm. thick, weighing 7 to 9 gm.; of each composition, one disk was quickly and another slowly cooled to room temperature. The results showed that (1) under the same conditions, the rapidly cooled (quenched) glasses are always dissolved more quickly than the slowly cooled glasses, the difference amounting to 0–500%; (2) in general, the speed of solution is lowest for specimens with average composition, but the influence of 1 is still effective in part. Little peaks in the solubility curve point to the existence of the compounds $4B_2O_3 \cdot Na_2O$, $3B_2O_3 \cdot Na_2O$, and $2B_2O_3 \cdot Na_2O$; (3) an effect of the stirring action seems to exist, as at higher velocities of movement greater differences between the quenched and cooled specimens were found; (4) the effect of temperature in dissolving (between 10° and 90°C.) was found to be considerable; the temperature coefficients decrease with increasing temperature, and the functions of logarithm of speed of solution minus $1/T$ are almost straight lines. See "Tempering. . .," *Ceram. Abs.*, **19** [11] 255 (1940); "Constitution. . .," this issue, p. 198. M.HA.

Mechanical properties of bare and coated glass fibers. N. KROTOVA. *Zhur. Tekh. Fiz.*, **14**, 455 (1944); translated in *Glass Ind.*, **26** [9] 418, 440 (1945). A.P.

Method for measuring fining time of glass. A. K. LYLE. *Jour. Amer. Ceram. Soc.*, **28** [10] 282–87 (1945).—5 references, 7 figures.

Naval amphibious forces wear Fiberglas armor. ANON. *Amer. Glass Rev.*, **64** [49] 20 (1945).—U. S. Navy amphibious forces are wearing a modernized version of the medieval coat of mail, with glass taking the place of steel. Life-preserver jackets provide pockets for the insertion of thin sheets of Fiberglas cloth impregnated with resin. The sheets have high impact strength, are lightweight, and will not rust or corrode in humid climates. A.P.

Notes on the design and efficiency of glass furnaces. W. A. MOORSHEAD. *Inst. Fuel War Time Bull.*, **1944**, April, pp. 124–25.—Crown insulation, consisting of a layer of loose silica brick with sand filling, one of high-temperature insulating brick with sand filling, and one of good low-temperature insulating brick, lowers fuel consumption by about 12%. Curves show size-fuel relationship for glass tank furnaces. Regenerator features are as follows: (1) For a given regenerator volume, the height should be the maximum in the space available and sufficient to give a hydrostatic head of at least 0.2 in. w.g. (2) Straight through passages should be 3.5 in. to 5 in. sq. to avoid the effects of slagging. (3) There should be 1.25 to 1.5 cu. ft. of space per cu. ft. of hot waste gases above the packing to allow even distribution of gases through the checkerwork. Curves show the effect of port design on combustion efficiency. A diagram of a counterflow furnace (Brit. Pat. 550,164) is given. Furnace temperatures have been lowered. Pressures have been increased by lowering stack dampers and, if necessary, forcing the combustion air in, and the proportion of waste gases entering the gas and air regenerators has been adjusted. Three waste-heat boilers being built are expected to produce 10,000 lb. of steam per hour and save 4000 tons of coal per annum. Recently the Furnace Committee of the Society of Glass Technology devised a new "yardstick" for the assessment of furnace performance (*Ceram. Abs.*, **24** [1] 6 (1945)). 4 figs. D.G.P.

Ophthalmic lens quality. ANON. *Optician*, **109** [2835] 443 (1945).—The physical quality of a spectacle lens is compounded from (1) the material, (2) the shape of its two surfaces, and (3) the finish of its two surfaces. Some claims have been made that there is a profound difference between felt-polished and pitch-polished surfaces. The question is raised whether only the higher-quality surfaces should be permitted in ophthalmic lenses. A.P.

Permanence of disannealing stresses in glass. F. W. PRESTON. *Jour. Amer. Ceram. Soc.*, **28** [10] 295–96 (1945).—2 references.

Plastics sandwiches. CHARLES A. BRESKIN. *Sci. Amer.*, **173,** 155–58 (1945).—A construction material for airplanes has been developed with surfaces made of a resin-impregnated glass cloth and the interior of foamed resin for rigidity and lightness. The strength is in the skin, and the core stabilizes the surface. The material is 10% heavier than aluminum alloy and over 50% stronger. This material has been used in a trainer fuselage and a fighter's nose. The glass cloth skin is formed, impregnated, and cured first, and then the molds are lined with it and the foamed resin is introduced. 5 figs. W.D.F.

Production of semireflecting films of chromium on plane mirrors. A. A. S. MOORE. *Jour. Sci. Instruments*, **22** [6] 101–107 (1945).—The production of semireflecting films by the evaporation process presents a number of difficulties in the control of density and distribution. Experiments are described whereby an improved output can be obtained by the use of electroplated filaments, and modifications are described which correct for small departures from the inverse square law. G.A.K.

Reconversion of Corning Canadian plant. ANON. *Bull. Amer. Ceram. Soc.*, **24** [10] 361 (1945).

Solar house: a full scale experimental study. F. W. HUTCHINSON. *Heating & Ventilating*, **42** [9] 96–97 (1945).—H. discusses a study being made at Purdue University of solar-heat possibilities. Two full-sized houses have been constructed for the experiment, one an orthodox house and the other identical except for two-thirds glass area on the southern exposure. During the coming winter the two houses are to be heated electrically, and the costs will be compared for maintaining conditions of equivalent comfort in both structures. 1 photograph. M.R.

Solarization. HARVEY C. RENTSCHER. *Sci. Amer.*, **173,** 174–76 (1945).—Glass in ultraviolet lamps tends to deteriorate or solarize as the lamps are used. It has been found that Vycor glass transmits ultraviolet readily down to 2500 a.u. and does not solarize. It does not transmit below 2000 a.u., which is the ozone-forming region. Vycor and quartz do not solarize, but almost all other glasses do. To find the reason, spectrographic analyses were made of Vycor, quartz, and some of the glasses that solarize. All samples showed similar amounts of Fe, Mg, Mn, Al, Ca, and Ti. Na, however, was abundant in the glasses but was not found in quartz and Vycor. The presence of alkali is apparently responsible for the solarization. 3 figs. W.D.F.

Strength of glass as affected by dealkalizing its surface. W. A. WEYL. *Glass Ind.*, **26** [8] 369–71, 386, 388, 390 (1945).—The dealkalizing process with metakaolin described in a previous paper ("Surface . . . .," *Ceram. Abs.*, **24** [9] 163 (1945)) should affect the mechanical strength and thermal endurance of the glass. To prove that it does, thousands of tests would have to be evaluated, and because his laboratory is not equipped to perform these experiments W. presents his ideas on the subject with the intention of stimulating research in testing laboratories of glass plants. Considerable data are available to prove that exposure to furnace gases during annealing decreases surface alkalinity and improves mechanical strength.

Formation of a surface layer of higher chemical resistivity should also improve fatigue endurance. Various methods are available for bringing the surface layer of a glass into a state of compression: (1) controlled chilling; (2) casing two glasses of different thermal expansions or different setting temperatures; and (3) chemical methods, including reaction with furnace gases, base exchange with fused CuCl, and the metakaolin treatment. The latter method would not be in direct competition with existing methods but would be used where (*a*) it is desirable to increase chemical resistivity or electrical surface resistance in addition to mechanical strength; (*b*) the tempering process cannot be applied; or (*c*) isotropic strain distribution is an asset. A.P.

Sun house. ANON. *Heating & Ventilating*, **42** [9] 104, 106 (1945).—Hobbs Glass, Ltd. (Canadian affiliate of Libbey-Owens-Ford), is building an experimental house at Toronto, Ont. It will have a solar zone on the south and a nonsolar zone on the north side of the building. The solar heat will supplement radiant heat from floor panels and fireplaces. The house will be equipped with large Thermopane windows permanently fitted in their sash, and all ventilation air is supplied mechanically. The fireplace will be similar to a glass stove with tight doors of armored glass and will be situated in the partition between living and recreation rooms. The armored glass door on the living room side will be transparent and on the recreation room side translucent. M.R.

PATENTS

Apparatus for making glass film. GAMES SLAYTER AND HENRY SNOW (Owens-Corning Fiberglas Corp.). U. S. 2,386,511, Oct. 9, 1945 (Oct. 2, 1943). 5 claims. Cl. 49-17.—1. Apparatus for producing glass film comprising a bushing having an annular discharge orifice through which molten glass flows in the form of a hollow stream, means for introducing fluid under pressure into the stream, and means for confining the stream including a tube positioned to receive the stream and having a portion which progressively flattens to correspondingly flatten the stream.

Change of the reflectivity of transparent objects, especially of optical glasses. JENAER GLASWERK SCHOTT & GEN. Ital. 386,244, May 8, 1940; abstracted in *Chem. Zentr.*, **1943, I** [7] 772.—The change is brought about by one or several superimposed transparent resistant layers formed on the glass by a gel-like oxihydrate low in water. A suitable mixture for such layers consists, e.g., of 3 parts (by volume) of $TiCl_4$, 1 $SiCl_4$, and 10 CCl_4. If this mixture is blown from a nozzle in the air of a room to a plate heated to above 100°C., a perfectly clear layer of gel is formed of such high refractive index that it can contain practically no Si, so that it is a pure TiO_2-gel layer. The conditions for $AlCl_3$ are similar to those for $TiCl_4$. M.HA.

Electric incandescent lamp with an arrangement for separating the visible and infrared parts of the radiation. VEREINIGTE GLÜHLAMPEN UND ELEKTRIZITÄTS AKT.-GES. Ger. (Austria branch) 156,139, May 10, 1939 (Dec. 3, 1937); cl. 21*f*; Dutch 52,726, July 15, 1942 (Nov. 26, 1937); Fr. 830,156, July 22, 1938 (Nov. 30, 1937); Brit. 497,880, Jan. 26, 1939 (Dec. 8, 1937); abstracted in *Chem. Zentr.*, **1943, I** [1] 72.—A suitable arrangement of prisms or pyramids of opal glass or opal quartz disperses the visible part of the radiation and reflects the infrared part by total reflection with good efficiency to the incandescent body, thus improving the economy of the lamp. This arrangement is particularly suited for lamps filled with rare gas or mercury under high pressure. M.HA.

Electrical heating of articles made of glass or other vitreous material. MAURICE DESCARSIN (Alien Property Custodian). U. S. 2,385,567, Sept. 25, 1945 (Sept. 25, 1941; in France May 15, 1941). 4 claims. Cl. 219-47.

Glass containers. L. HORN. Brit. 571,149, Aug. 22, 1945 (Dec. 1, 1943).

Glassforming machine. T. H. SLOAN (G.M.S. Corp.). U. S. 2,384,498, Sept. 11, 1945 (Sept. 3, 1938). 9 claims. Cl. 49-9.

Glass houses. B. M. BAILEY, W. C. B. WIGGIN, AND A. L. WIGGIN. Brit. 571,475, Sept. 5, 1945 (Aug. 6, 1943).

Glass-lined containers for corrosive substances. P. E. KNUDSEN (Pittsburgh Plate Glass Co.). U. S. 2,385,924, Oct. 2, 1945 (Oct. 19, 1943). 5 claims. Cl. 206-2.

Glassmelting furnace. W. A. MOORSHEAD (United Glass Bottle Manufacturers, Ltd.). U. S. 2,385,529, Sept. 25, 1945 (Oct. 9, 1942; in Great Britain Nov. 26, 1941). 2 claims. Cl. 49-54.

Glass-metal fusion, in particular leads for electric discharge vessels with metallic wall parts. FIDES GESELLSCHAFT FÜR DIE VERWALTUNG UND VERWERTUNG VON GEWERBLICHEN SCHUTZRECHTEN M.B.H. Ital. 387,532, Jan. 25, 1942; abstracted in *Chem. Zentr.*, **1943, I** [1] 72.—Between the fused metal parts an insulator is arranged whose specific resistance at 300°C. is at least 7×10^9 ohms per cm. and which consists of stable oxides, e.g., Al_2O_3, MgO, BeO, and ThO_2. M.HA.

Glass tank. M. S. TARNOPOL (Pittsburgh Plate Glass Co.). U. S. 2,385,954, Oct. 2, 1945 (May 30, 1944). 2 claims. Cl. 206-2.—1. In a corrosion-resisting tank, opposite plate glass side walls, opposite plate glass end walls, and a plate glass bottom, the several glass plates at their junction with one another having interfitting groove and edge connections.

Joining of glass and metal. LICENTIA PATENT-VERWALTUNGS-G.M.B.H. Swiss 221,437, Aug. 17, 1942 (Feb. 24, 1941); abstracted in *Chem. Zentr.*, **1943, I** [10] 1096.—The method is characterized in that (1) a glass of about 34 SiO_2, 28 B_2O_3, 7 Al_2O_3, 29 PbO, and 2% Na_2O is fused to metal parts of an iron-nickel alloy with about 42% Ni and at least 57% Fe, and (2) the glass is poured onto the metal parts arranged in a mold. M.HA.

Machine for making stemware. J. P. SCHELLHAUS, JR. (Owens-Illinois Glass Co.). U. S. 2,385,302, Sept. 18, 1945 (March 28, 1942). 22 claims. Cl. 49-1.

Making glass. H. P. HOOD (Corning Glass Works). U. S. 2,386,685, Oct. 9, 1945 (Feb. 14, 1944). 1 claim. Cl. 49-77.—The method of making glass, which comprises slowly heating a glass batch to an elevated temperature between about 600° and 800°C., maintaining the heated batch under atmospheric pressure, passing through and over the batch a current of air which is substantially free from carbon dioxide and water vapor until the gaseous by-products of the reacting batch materials have been eliminated, and thereafter melting the batch.

Manufacture of enamels for the coating of incandescent bulbs. COMPAGNIE DES LAMPES. Fr. 863,960, April 15, 1941 (March 11, 1940); abstracted in *Chem. Zentr.*, **1943, I** [5] 555.—The coatings should have a low melting point and suitable expansion coefficient and must be easy to color. The usual Pb-containing additions are avoided and replaced by the oxides of Ba, Ca, Cd, Zn, or B. The amount of SiO_2 can be between 8 and 32%, of Al_2O_3 between 1 and 6%, and of B_2O_3 between 10 and 45%. Opacity of white enamel is obtained particularly by As or Sb oxides in amounts of 4 to 12%. Chemical resistance is obtained by Zr oxide up to 6%. ZnO lowers the melting point and expansion coefficient when added in amounts between 0 and 24%. Example (in %): 18.2 SiO_2, 10.7 Sb_2O_5, 1.8 Al_2O_3, 5.4 ZrO_2, 10.5 BaO, 11.1 CaO, 5.3 ZnO, 3.6 CaF_2, 1.8 Na_2SiF_6, 7.8 Na_2O, 1.6 Li_2O, and 32.4 B_2O_3. M.HA.

Manufacture of glass containers. G. S. SHAW. Brit. 571,310, Aug. 29, 1945 (Nov. 13, 1943).

Manufacture of optical silicate glasses with definite refractive index. JENAER GLASWERK SCHOTT & GEN. Ital. 389,759, June 9, 1941; abstracted in *Chem. Zentr.*, **1943, I** [7] 771–72.—To obtain a refractive index that is low with reference to the mean dispersion, the glass batch is selected as follows: (1) The content of fluorides and of $Al_2O_3 + TiO_2$ is as large as possible, the content of alkaline-earth oxides and B_2O_3 is as small as possible, and only alkalis are present in larger amounts, with eventually PbO, Sb_2O_3, and As_2O_3. (2) A starting batch free of fluorides contains at least 5% and not more than 30% alkali oxide of which at least half is K_2O, and the oxides contained in the batch are replaced in part by corresponding fluorides.

(3) In a starting batch free of fluorides the contents of B_2O_3, Al_2O_3, and TiO_2 together amount to at least 5% and not more than 45%, and the oxides contained in the batch are replaced in part by corresponding fluorides. (4) The contents of B_2O_3 and Al_2O_3 together amount to at most 40%, or the batch contains at least 95% of SiO_2, B_2O_3, Al_2O_3, and alkali oxide, the latter consisting at least half of K_2O. (5) The contents of Al_2O_3, TiO_2, Sb_2O_3, and As_2O_3 together amount to at least as much as the B_2O_3 and alkaline-earth oxides together; example: 47.1 SiO_2, 13.5 B_2O_3, 20.3 Al_2O_3, and 19.1% K_2O or 15 SiO_2, 15 B_2O_3, 20 Al_2O_3, 20 K_2O, and 30% Sb_2O_3. M.HA.

Refractory, heatproof glass. FIRMA JOS. RIEDEL (Arno Riedel, inventor). Ger. 727,037, Oct. 27, 1942 (Dec. 8, 1939); cl. 32*b*; abstracted in *Chem. Zentr.*, **1943, I** [4] 456.—The glass is characterized in that (1) it contains, in the place of boric acid and lime as glassforming substances, MgO in an amount of 10 to 15%, while the content of alkali oxides is at the most 8%, and that of Al_2O_3 and ZnO, singly or together, is up to 5%; and (2) it contains Sb_2O_3 and As_2O_3 either singly or together. Such glass is melted so that MgO is added to the melt in the form of $MgCO_3$, $MgSO_4$, or $MgSO_4 \cdot 7H_2O$, or it is also added in the form of $MgCO_3 + MgSO_4 \cdot 7H_2O$ or $MgSO_4$ together. M.HA.

Treatment of glass, etc. JOHNSON, MATTHEY & CO., LTD., AND F. E. KERRIDGE. Brit. 571,238, Aug. 22, 1945 (April 18, 1944).

Structural Clay Products

Brick for dampproof course. C. W. C. *Brit. Clayworker*, **54** [637] 30 (1945).—Among the many materials specified for dampproof courses, brick gets less than its fair share of attention. This was not the case in the past, e.g., 40 years ago no less than seven brick or tile expressly made for dampproof course were illustrated in a standard work on building construction. Specimens in excellent condition were found during demolition of a 19th-century property. In recent years the tendency has been to rely on bituminous felt, with or without lead core, such material being cheap, handy, and easy to lay. A good dampproof course should last as long as the building it is supposed to protect, and it is not certain that cheap flimsy material will suffice. Slates are well recognized and are often specified; yet everything depends on quality, and slate which complies with the letter of the law may in time become saturated and pulpy, with disastrous results. British Standard Specification No. 743 recognizes the use of vitrified brick for dampproof course, and, in addition to Staffordshire blues, it is likely that any high-class engineering brick would pass the tests. For exposed positions, an actual facing of brick with semivitrified surface is effective in keeping out damp. L.C.C.

Brick treasures. ANON. *Brit. Clayworker*, **54** [637] 29 (1945).—The modern use of brick probably owes more to Sir Christopher Wren than to any exponent. The term "modern" refers to regular brickwork with thin joints for buildings of Renaissance design having the moldings of cornice, window architraves, and doorway of the same character. The older and rougher work of Gothic character does not fall in this category. Gauged work was frequently used in the middle of the 17th century and was greatly stimulated after the Restoration through Dutch and other continental influences. The fullest development of brick (molded, cut, rubbed, and carved), in association with stone, plaster, and white-painted wood, was undoubtedly due to the influence of Wren. Many examples survive in and near London, e.g., King's Bench Walk, Bluecoat School, and Middle Temple Gateway. Morden College, Blackheath, owes its homey effect to deep red brick, with window arches gauged in lighter red and with stringcourses, quoins, and entrance doorway of plastered, white-painted brick. The school of Wren was responsible for the best brick architecture ever produced in England. With fine instinct, gauged work was associated with rich ashlaring, as at Hampton Court, or rough-textured brick of deep red color laid with thick joints, with Portland stone architraves and carved stone swags, as at Winchester. The local brick was instinctively mated with precisely the correct dressing. The influence of Wren decreased after his death, and the increasing manufacture of gray stocks in the London region hastened a change of fashion, until red brick was actually condemned, in the middle of the 18th century, as unpleasing. In the provinces, where gray stocks were not available, red brick continued to be used, and many sound pleasing houses are to be found in nearly all country towns. L.C.C.

Built in a week. ANON. *Brit. Clayworker*, **54** [636] 20 (1945).—Using a new type of brick, four Europeans and four natives built a house of three rooms, with bathroom, kitchen, and veranda, in one week. The brick fit into each other, leaving a wall cavity into which cement is poured, binding the whole together. The cost is considerably less than that of a similar house in England. A house built in this way is not prefabricated but is a permanent brick-built structure. The possible rate of building is extremely high. L.C.C.

Effect of brick absorption characteristics on mortar properties. F. O. ANDEREGG. *Proc. Amer. Soc. Testing Materials*, **42**, 821–36 (1942).—Absorption characteristics were determined on several types of brick taken from different parts of the kiln. Bond and joint mortar compressive strengths obtained with a 1:2:9 mortar at 28 days in contact with several types of brick are plotted against 1-min. absorptions. The result on mortar strengths of wetting three of the more highly absorbent brick is shown graphically. Strengths are recorded for joint mortars varying in composition from straight lime to straight Portland cement for ages up to 1 year. Discussion. W.R.B.

Fine grinding. ANON. *Brit. Clayworker*, **54** [637] 34 (1945).—Many brickmaking clays occur in large masses which require breaking down. They usually contain a large proportion of sand or other nonplastic material, even stones of various sizes. The true clay can be fully utilized only by saturating each particle with water, but it is usually unnecessary to incur the heavy cost of fine grinding required for this. Fineness of grinding must be decided by the brickmaker, who must bear in mind that where the strongest brick are needed irregular mixtures of clay, sand, and gravel are not satisfactory, the brick being easily damaged by frost after rainy weather. If made from clay containing a large proportion of gravel or broken stone, they frequently give way along the edges and have a much lower crushing strength than if made from the same material ground to pass a 24- x 24-mesh sieve. Gravelly clay that is plastic when dug is best dried and ground. Crushing rolls cannot be relied upon to reduce below $^1/_8$ in., and fragments of this size may prove a great source of weakness. L.C.C.

Flaws. ANON. *Brit. Clayworker*, **54** [637] 30 (1945).—Flaws in clayworking may be caused by too rapid heating, insufficient ventilation, or particles of foreign matter introduced during manufacture. Black cores, a common class of defect, arise from the decomposition of pyrites. To prevent flaws in general, ventilation should be good, and heating should be carried out slowly during the oxidation period, particularly as the temperature approaches 1000°C.; otherwise pyrite may react with carbonaceous matter, forming black cores. Large grains of calcareous material may result in colored spots and irregular hollows, and other defects may be caused by contact of the enamel with impurities in the body. L.C.C.

Human quality in brickwork. CHARLES REILLY. *Brit. Clayworker*, **54** [637] 41 (1945).—R. considers that brickwork is suited to the national character, the sedate richness of good work exhibiting honesty, quality, and freedom from sham and appealing to the British mind more than the grandeur of stone and other more monumental materials. The versatile nature of brickwork is due to the ease with which brick may be modeled or even rubbed and cut,

as in Wren's achievements. Broadly speaking, brickwork belongs naturally to the age of oak and of the oak view of life, i.e., of solid utility and comfort, and the tile roof completes the alliance. The use of brick in vaulting is comparatively rare but leads to most impressive results. For example, the grandeur of certain Roman brick piers and vaults is not matched by stone or concrete structures and is probably due to the smallness of the brick unit. Nearer our own times, striking examples of impressive brick masses are Hoare's Bank (vaults), King's Cross Station (arches), and Westminster Cathedral (piers, walls, and arches). In solid engineering jobs, the blue-brick retaining walls north of Euston Station reach a standard of impressive strength and massiveness comparable to that of Roman work. Nowhere in brickwork is the human quality more essential than in garden walls, where a mellow, peaceful, and sunny appearance is so telling. Here the modern architect has a great advantage, owing to the wide range of colors now available. New work can be made rich, warm, and colorful at the very start and need not wait for the mellowing influence of time. L.C.C.

Influence of bituminous matter in brick clays. ANON. *Brit. Clayworker*, **54** [636] 14–15 (1945).—The presence of combustible matter in brick clays is not recognized as much as it should be, and failures have occurred through firemen not understanding the nature of this ingredient. Pure bitumen does not occur in British clays, but black organic matter, of the nature of bituminous coal, does. So-called bituminous clays are usually dark in color, but there are exceptions, e.g., in Yorkshire, where some clays, although not very dark, contain so much bituminous matter that they must be fired with great care. Small amounts of bituminous matter should give little trouble if the ware is set closely in the kiln, but larger proportions may result in reduction of the ware to a mass of clinker. In firing these difficult clays, particular care is necessary from the beginning of visible red heat to the end of the firing. Steady and regular rise of temperature is difficult to obtain and can be assured only by the use of a kiln free from leakages, complete and rapid control over air vents and dampers, and the services of a fireman who knows his work. Even if the proportion of bituminous matter is not sufficient to "set the kiln on fire," it may be enough to cause goods to shell or blister. The presence of bituminous matter is particularly objectionable in clays used for the manufacture of drainpipe, which act as chimneys, increasing the draft and leading to overheating. With British clays containing bituminous matter, even after the critical firing period has been safely passed it will often be necessary to soak at red heat for a considerable time to give good color and to avoid black hearts. Some shales are so rich in bituminous matter that it is almost impossible to fire them economically, and they must be mixed with suitable material, e.g., lean clay free from bituminous matter or crushed rock or sand. Clays that require so much skill and attention in firing are seldom profitable for making common brick, although the saving in fuel is often great, some of the best-known bituminous clays requiring only 0.5 cwt. of coal per 1000 brick. L.C.C.

Measurement of bond between brick and mortars. J. C. PEARSON. *Proc. Amer. Soc. Testing Materials*, **43**, 857–69 (1943).—As a laboratory test, a mechanized assembly of the old cross-brick couplet was found to give the most satisfactory results for bond in tension. Another test consisted in prying up brick, laid in mortar on top of a wall, with a lever under measured load. The couplet test was found more reliable, although both tests gave reasonably parallel results. The couplet test furnishes a simple means of estimating bond strengths to be expected in actual brick construction. Discussion. W.R.B.

Relations between results of laboratory freezing and thawing and several physical properties of certain soft-mud brick. J. W. MCBURNEY. *Proc. Amer. Soc. Testing Materials*, **42**, 837–44 (1942).—Fifty brick representative of the production of 10 plants making soft-mud brick from surface clay were subjected to the various tests prescribed by the current A.S.T.M. specifications. Additional tests were made using the methods of Stull and Johnson ("Properties. . . ," *Ceram. Abs.*, **20** [4] 94 (1941)). Freezing and thawing tests were made until 175 cycles were completed. Results of 50 cycles and 175 cycles were compared. The relationships of water absorptions, saturation coefficients, strengths, porosity, air permeability, and pore system to resistance to freezing and thawing were considered and are shown to be much more definite for 175 cycles than for 50 cycles. W.R.B.

Research—is it worth while? A brickmakers' view. W. G. WHITEHOUSE. *Brit. Clayworker*, **54** [637] 28–29 (1945).—W. considers the Third Report of the Committee on the Brick Industry (*Ceram. Abs.*, **24** [10] 188-89 (1945)), which outlines the advantages and cost of a laboratory organized for carrying out local research work. He agrees that there is great need for extending this type of work and gives examples from his own experience in which even simple laboratory inspection would have prevented substantial financial losses caused by such factors as a patch of difficult clay or ignorance of the characteristics of different types of coal. L.C.C.

Salt glazing. ANON. *Brit. Clayworker*, **54** [637] 34–35 (1945).—Factors involved in successful salt glazing and the common mistakes made during this process are reviewed. L.C.C.

Tests of the fire resistance and thermal properties of solid concrete slabs and their significance. C. A. MENZEL. *Proc. Amer. Soc. Testing Materials*, **43**, 1099–1153 (1943). —Tests developed significant information on thermal properties (heat transmission, expansion, etc.) of solid concrete made with widely different aggregates: (1) highly siliceous sand and gravel, (2) calcareous sand and gravel, (3) fine and coarse crushed Haydite, and (4) mixtures of equal volumes of 1 and 3. Relationships are established between slab thickness (or weight per square foot of slab) and the fire-endurance period for each type of aggregate. Other relationships are also given. W.R.B.

Using colliery waste. ANON. *Brit. Clayworker*, **54** [638] 60 (1945).—A firm of brickmakers tried out washed colliery waste, a black muddy material of a particle size less than $^1/_{16}$ in. The cost was a few pence per ton, as it was not worth briquetting and was too fine to sell as slack. It was mixed with the clay at the rate of 1 ton of waste to 50 tons of clay. The brick (wire-cut) were dried and fired in an 18-chamber continuous kiln. The results showed (1) a reduction in ordinary fuel consumption to 1.5 cwt. per 1000 brick, (2) an increase of kiln output by two chambers per week, and (3) uniform and satisfactory firing, with good color for commons and increased strength. Any increase of the proportion of waste slowed down the kiln speed, and the above figure (2%) was found most suitable. L.C.C.

Weathering. ANON *Brit. Clayworker*, **54** [638] 60 (1945).—Many clays do not need the intensive treatment effected by weathering, and there has recently been a tendency to replace it by the use of machinery. Usually edge-runner mills are employed, the most suitable type depending on the nature of the clay, e.g., a hard clay or shale will require different treatment from damp or sticky material. The perforations of the pan may be round or slotted but must be small enough to insure that the water, whenever added, reaches every particle. It is essential, if natural weathering is to be ruled out, that mechanical preparation be thorough; otherwise uneven distribution of water will result in cracks and other defects at a later stage in the manufacture. L.C.C.

Refractories

Alumina from clays—a current summary of products and processes. ANON. *Chem. Industries*, **54** [1] 65 (1944).—Three developmental plants will be built by Defense Plants Corp. Two will use the lime-soda sinter process. The disadvantage of this process is the high cost of limestone and coal. The third plant will use the am-

monium sulfate process; its disadvantage is the cost of ammonia. Kalunite, Inc., has a plant in operation that uses alunite, a high alumina-potash material. The ore is treated with sulfuric acid, giving potassium alum which is decomposed into basic alum and then calcined to give alumina. The Phelps Dodge Corp. has developed a similar process. Another process extracts the alumina from the roasted clay with HCl. E.D.M.

Applying prepared atmospheres to metal processing. E. G. De Coriolis. *Steel Processing*, **31** [8] 509–13 (1945).—D. discusses the purpose of applying prepared atmospheres to metal processing, the preparation of seven types of atmospheres, the types of equipment used, and atmosphere-furnace construction. In the latter, for most operations, ordinary firebrick cannot be used as a refractory, because it is attacked by many of the atmospheres used in these furnaces. The lightweight refractories are generally selected because they are usually made from high-grade materials that are not affected by these atmospheres and for their insulating value, which makes it possible to reduce wall thickness. For carrying loads within the furnace structure or where mechanical strain is applied, hard-fired refractories of high purity are in use which are capable of withstanding attack by highly reducing atmospheres. 6 references. M.R.

Durability of refractories. W. J. Rees. *Jour. Birmingham Met. Soc.*, **24**, 102–17 (June, 1944); abstracted in *Inst. Fuel War Time Bull.*, **1945**, Aug., p. 286; see *Ceram. Abs.*, **24** [10] 182 (1945). D.G.P.

Open-hearth basic, silica, and bottom refractories. V. Gregor. Presented at meeting of Chicago Section of the National Open Hearth Committee, Iron and Steel Division, of the A.I.M.M.E.; abstracted in *Ind. Heating*, **12** [9] 1564 (1945). M.Ha.

Open-hearth furnace controls. V. Gregor. Presented at meeting of Chicago Section of National Open Hearth Committee, Iron and Steel Div., of the A.I.M.M.E.; abstracted in *Ind. Heating*, **12** [9] 1534 (1945). M.Ha.

PATENTS

Method of separating magnesia from dolomite. W. E. Wing (Marblehead Lime Co.). U. S. 2,386,027, Oct. 2, 1945 (Jan. 21, 1944). 5 claims. Cl. 23-201.

Production of calcium and magnesium compounds from dolomite. Frank Elkington and H. H. Chesny (Elkington assignor to Chesny). U. S. 2,386,389, Oct. 9, 1945 (Feb. 24, 1941; in Great Britain June 6, 1939). 5 claims. Cl. 23-67.

Repairing of hearths of metallurgical furnaces. United Steel Companies, Ltd., G. A. V. Russell, and E. R. Coy. Brit. 571,142, Aug. 22, 1945 (Jan. 31, 1944).

Slag-resisting refractory brick. Soc. Industrielle et Commerciale des Aciers. Fr. 872,272, June 3, 1942 (May 19, 1941); abstracted in *Chem. Zentr.*, **1943, I** [5] 555.—Lime-free, SiO_2-containing material is mixed with flour of acid or neutral molten rock such as quartz containing porphyry, granite, keratophyre, trachyte, trass, phonolite, or a mixture of these, in amounts of 8 to 30%. M.Ha.

Whiteware

Ceramic insulators for spark plugs. D. Turner. *Eng. Materials*, **3**, 110–14 (June, 1945); abstracted in *Ind. Diamond Rev.*, **5** [58] 212 (1945).—T. presents a survey of the properties required for spark-plug insulators and the properties of hard porcelain, steatite, and recently sintered alumina. Sintered alumina has been used with great success for airplane-engine spark plugs. The material is very hard (Mohs' hardness, 9) and abrasion resistant. At low and high temperatures the electrical volume resistivity is extremely high. Thermal conductivity is 20 times that of porcelain and is comparable to that of steel. Reference is made to a brochure on Syntox, made by Lodge Plugs, Ltd., Rugby.

Glazes and glasses. Felix Singer. *Pottery and Glass*, **23** [2] 31–34 (1944).—Glasses and glazes are chemically and physically related to each other, the only real difference being in the method of shaping them. The results of scientific investigations on glasses are more easily explained, because the experimental procedure is more straightforward and does not necessarily deal with the much more complex conditions that affect the formation of ceramic glazes. The application of glass analogies to glaze research has often proved very profitable. Further progress in our knowledge and understanding of glazes may be expected from the results made available by more recent glass investigations. S. discusses defects in glazes, the role of alumina, bulk production, the application of glazes, and viscosity.

PATENTS

Activation of electrical conductors which are nonconductors when cold. Stupakoff Ceramic & Manufacturing Co. Brit. 571,279, Aug. 29, 1945 (March 19, 1942).

Brushing machines, more especially for brushing fired earthenware. Service (Engineers), Ltd., and J. A. Johnson. Brit. 571,356, Sept. 5, 1945 (Sept. 30, 1943).

Ceramic insulating body. N. V. Philips' Gloeilampenfabrieken. Belg. 443,495, Oct. 7, 1942 (Nov. 24, 1941); abstracted in *Chem. Zentr.*, **1943, I** [13] 1397.—The body consists of B_2O_3, with an addition of TiO_2, and is fired in a reducing atmosphere to obtain dense sintering. M.Ha.

Ceramic material. M. D. Rigterink (Bell Telephone Laboratories). U. S. 2,386,633, Oct. 9, 1945 (Oct. 10, 1944). 20 claims. Cl. 106-46.—1. A fired ceramic material which physically comprises a substantial proportion of small crystals and a substantial proportion of glass cementing together the crystals, which ceramic material chemically essentially comprises constituents which, calculated as oxides, form a composition falling within the parallelogram-shaped area on an XO_2–Y_2O_3–ZO mol % triaxial diagram approximately bounded by the parallel lines indicating 60 and 68 mol % of XO_2 and the parallel lines indicating 17 and 23 mol % of Y_2O_3, in which diagram XO_2 represents a substance chosen from the group consisting of SiO_2 and SiO_2 plus a minor proportion of ZrO_2, Y_2O_3 represents a substance chosen from the group consisting of Al_2O_3 and Al_2O_3 plus a minor proportion of B_2O_3, and ZO represents the sum of at least three alkaline-earth oxides each constituting at least 1 mol % of the composition, and which ceramic material contains no more than a small amount of alkali metal oxide.

Manufacture of hollow ceramic ware. Mintons, Ltd., and A. J. Campbell. Brit. 571,092, Aug. 22, 1945 (Nov. 13, 1943).

Manufacture of steatite-like ceramic products. Albert Wolfgang Schmidt. Ger. 725,526, Sept. 24, 1942 (Aug. 15, 1939); cl. 80*b*; abstracted in *Chem. Zentr.*, **1943, I** [13] 1403.—The steatite is replaced by artificial Mg silicates of any adjustable composition that are obtained in the causticization of alkali silicate solutions with MgO together with other alkaline-earth oxides, such as by-products and waste products. M.Ha.

Method and apparatus for jiggering pottery ware. W. J. Miller (Miller Pottery Engineering Co.). U. S. 2,384,845, Sept. 18, 1945 (Jan. 29, 1944). 21 claims. Cl. 25-26.—1. The method which comprises jiggering plastic material in proximity to a high-velocity, spirally moving stream of fluid carrying away the scrap clay and applying lubricant to the ware from a position below the level of the stream of fluid.

Spark plugs for internal combustion engines. Lodge Plugs, Ltd., and B. Hopps. Brit. 571,460, Sept. 5, 1945 (May 26, 1944).

Equipment and Apparatus

Approximate requirements for exhaust systems. H. M. NICHOLS. *Amer. Artisan*, **114** [5] 86 (1945).—N. lists the performance data for exhaust systems handling 277 to 16,600 cu. ft./min. A table gives horsepower requirements for load areas up to 424 sq. in. E.P.M.

Balance of radiation in employing optical pyrometry. M. JAKOB. *Combustion*, **16** [2] 49 (1944); abstracted in *Inst. Fuel War Time Bull.*, **1945**, Aug., p. 287. D.G.P.

Borescopes for visual inspection of internal surfaces. ANON. *Chem. Preview*, **8** [1] 95 (1945).—The borescope consists of a head containing a source of illumination and a tilted Stellite mirror which reflects the image through a series of anachromats in a seamless steel tube body to the adjustable eyepiece. It is available in separable units to form a borescope 6 to 30 ft. in length. It can be graduated for determining longitudinal and angular location of faults. A right angle borescope is furnished in a maximum length of 12 in. It is made by Polan Industries, Huntington, W. Va. J.F.H.

Carbon flues make laboratory fume line corrosion-proof. ANON. *Chem. Preview*, **8** [1] 8–9 (1945).—A laboratory fume line exhausting corrosive and noxious gases is constructed of corrosion-resistant carbon pipe manufactured by the National Carbon Co., New York, N. Y. Gases handled include ammonia, ether fumes, ethyl acetate, chlorine, and fumes of hydrochloric, sulfuric, hydrofluoric, nitric, and perchloric acids. The system is free of fume seepage. Details of construction are given. 1 sketch. J.F.H.

Commercial thermostats in theory and practice. R. GRIERSON. *Heating & Ventilating Engr.*, **12**, 149–74 (1944); abstracted in *Inst. Fuel War Time Bull.*, **1945**, Aug., p. 287. D.G.P.

Conductivity bridge in standard and special scale models. ANON. *Chem. Preview*, **8** [1] 26 (1945).—An instrument made by Industrial Instrument, Inc., Jersey City, N. J., employs a Wheatstone bridge circuit to measure the conductivity of electrolytes and reads directly in terms of concentration. Calibrations are obtainable for numerous solutions, including alkalis, acids, and distilled and industrial waters. The instrument operates on 110 v., 60 cycles. J.F.H.

Determination of dust in blast-furnace gas. D. G. HISLEY. *Iron & Steel Engr.*, **22** [6] 47–48 (1945).—Replacement of the standard thimble method by the sugar method eliminates errors due to moisture in the gas, size of sample, and weighing. B.L.

Direct reading high vacuum gauge 0 to 3000 microns. ANON. *Chem. Preview*, **8** [1] 15 (1945).—A vacuum gauge made by the Continental Electric Co., Geneva, Ill., has a range of 0 to 3000 microns with an accuracy of ±5% or 2 microns, whichever is greater. It operates from No. 2 dry cells. It is direct reading and remote indicating. Calibrations are obtainable for several gases. J.F.H.

Electronic liquid controller. ANON. *Chem. Preview*, **8** [1] 23 (1945).—Changes in liquid concentration which are accompanied by a change in electrical conductivity are indicated and controlled. A probe extends into the liquid, and changes in probe-circuit resistance of 5% over a range of 100 to 5000 ohms are detected electronically. The controller is made by Photoswitch, Inc., Cambridge, Mass. J.F.H.

Fine focus X-ray tubes for testing material. ANON. *Werkstattstech./Betrieb*, **38/23**, 223–24 (1944).—The fine-focus tubes permit the finding of small defects such as very small blowholes and crack formations. It is necessary to increase the definition and to employ enlarged pictures. The method of working is described in detail. As possible applications, the testing of castings, synthetic resins, and porcelain parts are mentioned among others. 5 figs. P.G.

Hardness and wear of galvanized hard-chromium films especially used for gauges. H. V. WEINGRAEBER AND G. LOTZ. *Werkstattstech./Betrieb*, **38/23**, 103–107 (1944). —The authors deal with the preparation and treatment of samples. Various methods of hardness testing are discussed, such as the scratch and indentation methods, for which purpose a Zeiss hardness tester was used. The wear was tested, and the Nieberding, Piersol, and Melle method is discussed; the actual tests were made on a Skoda-Sawin machine. Layers of chromium down to a thickness of 5 μ can be tested favorably with a microhardness tester using Vickers points (Zeiss and Schopper microhardness tester). No relation between hardness and wear was found, although the structure seems to have a decisive influence on wear. 8 figs. P.G.

High temperature electric furnace with Acheson graphite spiral heating element. T. W. TALWALKAR. *Trans. Indian Ceram. Soc.*, **4** [1] 18–22 (1945).—An electric furnace specially adapted for the P.C.E. test was made with Acheson electrode graphite as the heating element. A uniform heating zone, good regulation of the rate of heating, and a fairly oxidizing atmosphere were obtained. The furnace operates on 20 to 28 volts and 100 to 300 amp. The hot zone is approximately 3 in. long in the center of a tube 2 $^{5}/_{16}$ in. in internal diameter and 19 in. long.

High-temperature furnace for use under the microscope. A. JAMES LAMBETH. *Australian Jour. Sci.*, **7** [4] 118–20 (1945).—The construction is explained and illustrated. The use and applications of the apparatus are described. F.S.

Light and progress. JEROME CAMPBELL AND A. P. PECK. *Sci. Amer.*, **173**, 137–50 (1945).—A review. 14 illustrations. W.D.F.

Moisture tester. ANON. *New Equipment Digest*, **10** [9] 34 (1945).—The tester measures the moisture of plaster, lumber, cloth, etc., by power absorption from a high-frequency oscillator circuit. Tests are made in 3 sec. or less. It covers the low moisture range down to 0%. It is made by the Moisture Register Co., Alhambra, Calif. F.C.A.

New method for regulating temperature distribution. A. N. BYKOV AND S. I. KAFTAN. *Koks i Khim.*, **10** [4–5] 25–28 (1940); abstracted in *Inst. Fuel War Time Bull.*, **1945**, Aug., p. 287. D.G.P.

Polarizing microscope. ANON. *New Equipment Digest*, **10** [9] 9 (1945).—Vapor-, fume-, and heat-resistant Polaroid material is used in place of calcite. This results in sharper extinction points, freedom from residual color, and increased contrast. The microscope is made by the American Optical Co., Scientific Instrument Div., Buffalo 11, N. Y. F.C.A.

Portable tester for comparison of ferrous materials. ANON. *Chem. Preview*, **8** [1] 21 (1945).—This tester indicates variations in the analysis and heat-treatment of ferrous materials. The sample is introduced into the coil of a transformer excited by a 23-cycle current. The transformer secondary output varies with the magnetic characteristics of the sample and is impressed on a cathode-ray tube. The first and third harmonics of the fundamental wave vary with the analysis and heat-treatment of the material. The tester sorts common SAE steels except those in which the difference is small. It is manufactured by the Allen B. Dumont Laboratories, Inc., Passaic, N. J. J.F.H.

Pyrometer testing furnace. ANON. *Ind. Chemist*, **21** [247] 444–45 (1945).—A portable furnace suitable for operation on 200 to 250 v. single phase a.c. at a maximum temperature of 900°C. is described. It is well insulated but is fitted with a damper at the bottom to permit rapid cooling between tests. Containers for melts, immersion tubes, a hypsometer tube, and a line resistance are included. A potentiometer is also required. Directions for testing it and pyrometers are given. It is manufactured by Wild-Barfield Electric Furnaces, Ltd. 1 figure. D.G.P.

Recent developments in grinding ceramic materials in pebble, ball, and tube mills. G. F. METZ. *Bull. Amer. Ceram. Soc.*, **24** [10] 357–61 (1945).—1 reference, 9 figures.

Simple refractometer of the Jamin type. H. KUHN AND G. A. WHEATLEY. *Jour. Sci. Instruments*, **22** [6] 110–12 (1945).—A modification of the Jamin refractometer is described in which each of the thick glass plates is replaced

by two thin plates, separated by steel balls. It is thus possible to construct a refractometer, either for demonstration purposes or for precision work, without the use of high-quality optical components. Even when patent plate glass is used, good fringes can be obtained. G.A.K.

Small adjustable vice for hardness testers. H. v. WEINGRAEBER. *Werkstattstech./Betrieb,* **38/23,** 21 (1944). —The vice is a novel device for holding a specimen in the correct position during testing and permits the adjusting of different workpieces in the same position. The vice contains two saddles arranged in crosswise direction whereby the upper saddle carries the screw vice. The whole arrangement appears to be strong and rigid. 1 fig. P.G.

Superimposed precipitators for the cleaning of blast-furnace gas. B. B. FROST. *Iron & Steel Engr.,* **20** [10] 54–61 (1943).—Advantages and requirements for precipitator installation for two furnaces are discussed; plans are included. B.L.

Symposium on quartz oscillator plates: History of the quartz oscillator-plate industry, 1941–44. CLIFFORD FRONDEL. *Amer. Mineralogist,* **30,** 205–13 (1945).—Piezoelectric effects for quartz were first discovered in 1882 and first used to control a radio circuit in 1921. Quartz is used primarily for its chemical and physical stability. About 50,000 plates were made in 1939 and nearly 30,000,000 in 1944. Thousands of tons of raw quartz were obtained, mainly from Brazil. Considerable quartz was flown in. Domestic production was only a few tons, mainly from Arkansas. Unsuccessful attempts were made to synthesize large crystals. Many kinds of equipment had to be designed. Over 300 sets of X-ray equipment to control cutting angles were supplied to the industry. The so-called Beilby layer, a surface layer of misaligned amorphous and hydrated quartz, was found to be a reality. The crystals, when aged, increased in frequency and lost activity due to abrasion of the plates; they were renewed by etching. 20 references, 2 figs. **Piezoelectric quartz resonator.** KARL S. VAN DYKE. *Ibid.,* pp. 214–44.—(Outlined) I. The contributing properties of quartz. *A.* Highly perfect elastic properties. Quartz has the highest Q value, i.e., a quartz bell would ring longer than any other. *B.* Piezoelectric property. Quartz is a dielectric but more importantly it is piezoelectric, being mechanically deformed by an electric field. *C.* Piezoelectric resonator. The quartz can be replaced by an equivalent electric circuit which is experimentally unrealizable; it is a tuned circuit. *D.* Other factors. The necessary size of a resonator is roughly 1 to 100 mm. II. Mechanism of circuit influence by quartz. *A.* Piezoelectric strain-current relation. Mechanical properties develop electrical properties in proportion to their magnitude. At resonance the dielectric effect is overshadowed. *B.* Several circuit uses of the crystal resonator. They all resonate; sometimes they control and sometimes they select. *C.* Crystal-controlled oscillators. Usually the crystal is across a condenser. III. Importance of constant frequencies in communication. *A.* Carrier current vs. simple telephone circuits. Controlled high frequencies allow more messages on one pair of wires. *B.* Carrier principle in radio telephony. Successful operation imposes close frequency control. *C.* Precision of frequencies essential. Crystals may control directly or indirectly. *D.* Tactical benefits from crystal control. With crystals, any number of radio sets may talk to each other. IV. Importance of the orientation of quartz radio elements. *A.* Orientation for desired mechanical properties. The frequency depends on several constants and dimensions. *B.* Predimensioning. A satisfactory plate may be selected by duplicating the orientation, shape, and dimensions. *C.* Effects of orientation. Electrical fields perpendicular to the optic axis are most strongly coupled to mechanical strains. *D.* Oblique cuts. These usually vibrate in shear. V. Ranges of the characteristics in quartz-crystal units. *A.* Size. Plates 0.006 to 0.5 in. thick, nearly square, and 0.125 in. to 2 in. *B.* Frequency. 1000 to 100,000,000 cycles per second. *C.* Type of vibration. Contractional, flexural, or shear. *D.* Cuts. Referred to by angles or name. *E.* Temperature coefficients of frequency. This varies with the cut. *F.* Temperature range. From —55° to +70° or even +90°C. *G.* Load circuit. The impedance must be known. *H.* Activity. This depends on the crystal's electrical impedance. *I.* Voltage and power distribution. Voltage across the crystal is 10 to 150 v. *J.* Finish, surface, and mounting. Etching removes the abraded layer. Many are plated; others are pressure mounted or space mounted. *K.* Holders. The most accurate are hermetically sealed; military holders have given some trouble. VI. Future. No substitute for quartz is in sight. 9 references. **Effect of imperfections on the usability of quartz for oscillator plates.** JOSEPH S. LUCKESH. *Ibid.,* pp. 291–95.—Imperfect quartz used for the manufacture of communications crystals compared favorably with the highest quality raw material in regard to yield of satisfactory oscillator plates. Inclusions not visible except by their scattering effect on light do not prevent the use of quartz for crystals up to 8.5 megacycles. Inclusions visible to the unaided eye reduce the ability of the quartz to oscillate. Some twinning may be tolerated in specialized locations, as at corners. 1 fig. **Orientation techniques for the manufacture of quartz oscillator plates.** WILLIAM PARRISH AND SAMUEL G. GORDON. *Ibid.,* pp. 296–325.—The authors describe the theory, methods, and equipment used in orienting raw quartz and the reorientation of sections, bars, wafers, and blanks in various stages of processing. The orientation of quartz by optical determination of its "hand" and electrical measurement of polarity of the electric axis is discouraged because the latter test may be completely misleading due to electrical twinning. The characteristic light figures obtained on etched sections and bars when placed over an illuminated pinhole are the sole infallible and unambiguous criteria for the orientation of quartz. The light figures on etched Z and X sections and the determination of usable portions of electrical twins in etched wafers by characteristic light reflection or transmission are described. The optical methods include the use of two simple types of stauroscopes: one for orienting Z parallel to the reference edge of a glass mounting plate, and the other for determining X and Z directions in wafers. The conoscope is valuable for locating Z in quartz, whether faced or defaced. The notation of axes, faces, and cuts is given; all ambiguity is removed by referring the cuts to the crystal faces. Various minor methods such as the development of parting parallel to the X-axes by slowly immersing a heated thin basal section in water are reviewed. 43 references, 21 figs. **Precise angular control of quartz cutting by X rays.** WILLIAM PARRISH AND SAMUEL G. GORDON. *Ibid.,* pp. 326–46.—Methods for precise control of the cutting angles by X-ray measurements are described. The quartz must first be oriented by some other method (usually optical) before the X-ray method can be applied. The sense of direction of the cut is indicated by an arrow drawn on the outer surface of the test cut at the saw, and this direction is preserved in making the X-ray measurement. The X-ray technique is an adaptation of the Bragg ionization chamber method and involves measuring the angle between the surface of the test cut or blank and an atomic reference plane parallel or nearly parallel to the surface. All measurements are direct and require no computation. A Geiger-Muller tube operated in the proportional counter region is employed. Accuracy of the method is approximately $\pm 1.5'$. The measurement requires about 10 to 15 sec. and can be done by unskilled help. The procedures for calibrating the X-ray goniometer and measuring various types of cuts are described in detail. Methods involving precise angular adjustments of sections approximately oriented by other methods and the use of reflection intensity differences of certain planes on either side of the optic axis for detecting usable portions of electrical twins and negative and positive directions from Z are described. The methods are applicable to other fields. 13 references, 11 figs. **Cutting schemes for quartz crystals.** SAMUEL G. GORDON AND WILLIAM PARRISH. *Ibid.,* pp. 347–70.—

The various schemes for cutting small, large, and defaced quartz are critically reviewed. In the single mount or direct wafering methods, the quartz is set up once and wafered. These methods are favored by "production" men because they involve a minimum number of operations. They usually require orientation by hand and polarity determinations and the use of transfer jigs. The cutting accuracy and yield are low. In the *X*-block method, the crystal is mounted on a prism or rhomb face and a pair of *X* planes is cut. After etching, the block is oriented by parallelogram light figures, which are foolproof, and wafered. This method has greater precision and permits the maximum utilization of electrically and optically twinned quartz. It does not require the use of jigs, the cutting accuracy is high, and it allows an easily visualized set of orientation rules and accurate control of the dicing angle. Flawed areas may be painted out to avoid useless sawing and processing. A pair of *Z* planes is first cut on defaced quartz, *Y* is determined with the triangular light figures, and it is then handled as faced quartz. Large faced or defaced quartz (greater than 1000 gm.) is cut into thick *Z* sections and then into *X* blocks, which are wafered. If the quartz is of exceptional quality, it is cut into thin *Z* sections, the width of the desired blanks, and then into *Y* bars, which are cut into blanks. 18 references, 28 figs. **Methods and equipment for sawing quartz crystals.** WILLIAM PARRISH. *Ibid.*, pp. 371–88.—The principal types of equipment and methods for sawing, dicing, and squaring quartz crystals are described. In downcutting, the most widely used method, the diamond blade moves downward into the crystal, which is fixed. The Felker-type saw with worktable adjustable for horizontal and vertical angle corrections determined by X-ray measurements is the most successful. Surface grinders and milling machines are not so good because they require expensive reconversion, the quartz must be preset, and little or no angular correction is possible. Diamond blades of the notched or metal-bonded type are used. Their efficiency and accuracy depend on the quality of the sawing machine, type of entering surface, size of cut, speed, pressure, and coolant. The best results are obtained when the arc of contact is small, the entering surface is flat and perpendicular to the blade, and the saw is relatively free of vibration and with large flanges, a copious flow of proper coolant, low pressure, and relatively high blade speeds (4000 to 6000 surface ft. per min.). Methods for dicing and squaring are also described. 9 references, 16 figs. **Machine lapping of quartz oscillator plates.** WILLIAM PARRISH. *Ibid.*, pp. 389–415.—Pentagonal holes allow the crystal to rotate in the work holder during lapping. The blanks are lapped from 0.045 in. to 0.012 in. or 0.018 in., depending on the frequency desired. When finished, the faces must be parallel to a few fringes and must be 0.00004 in. too thick. A three-stage high-speed lapping-to-frequency machine using planetary-type motion laps is recommended; 30 to 55 crystals are carried in 5 revolving work holders between two stationary lap plates. The weight of the top plate, speed, and abrasive size are reduced in the three stages. The crystals are transposed when 0.0006 in. too thick. Total thickness variation is ±0.00002 in. A calibrated sensitive radio receiver coupled directly to the machine laps can be used to follow the progress of the crystals and achieve precision control of the stopping point. Various other types of laps are described. The converted drill press lap is most widely used. The work holder is driven between a pair of stationary lap plates. The calibrating machine lap works on the same principle but is smaller. Optical-type laps have disadvantages and are not commonly used. A special lap for single crystals and a milling technique in which as many as 1000 crystals at a time are tumbled are described. 27 references, 16 figs. **Final frequency adjustment of quartz oscillator plates.** CLIFFORD FRONDEL. *Ibid.*, pp. 416–31.—The art of finishing machine-lapped quartz oscillator plates to final frequency and activity specifications is discussed. Two general methods have been practiced: the abrasive lapping technique, now abandoned because of undesirable aging phenomena caused in the plate, and the etching-to-frequency method. The X-ray irradiation technique has a special field of application in making highly precise frequency adjustments and in salvaging over-frequency plates. The cause and cure of frequency and activity aging in quartz plates is discussed, and methods of adjusting the frequency of metal-plated wire-suspension type plates are described. 5 references, 14 figs. **Glossary of terms used in the quartz oscillator-plate industry.** ANON. *Ibid.*, pp. 461–68.—Terms from "activity" to "zero beat" are covered. See also this issue, pp. 210 and 211. W.D.F.

Temperature determination in furnace-testing laboratory. O. J. RESS. *Instrumentation*, **1** [2] 8–9 (1944); abstracted in *Inst. Fuel War Time Bull.*, **1945,** Aug., p. 288. D.G.P.

Thermocouples for furnace tube surface temperature measurements. C. G. R. HUMPHREYS. *Combustion*, **16** [6] 53–55 (1944); abstracted in *Inst. Fuel War Time Bull.*, **1945,** Aug., p. 283. D.G.P.

Vacuum grip lathe. ANON. *New Equipment Digest*, **10** [9] 10 (1945).—A polishing lathe made by the Crozier Machine Tool Co., Hawthorne, Calif., generates its own vacuum for holding the part without the use of a collet or chuck. It is designed for metal polishing but appears to have ceramic applications. F.C.A.

SEPARATE PUBLICATIONS

Clay Plant Equipment. ANON. Published by Eagle Iron Works, Des Moines, Iowa. Catalog No. 45, 1945. 24 pp., 44 figs. Free.—A line of raw material mining, precrushing, and fine-grinding units, developed and improved by the manufacturer since 1872, is described, including Eagle shale planers, dry pans, screen plates, wet pans, and double-roll crushers. Many interesting installation views, specification tables, and performance reports from users are included.

Modern pH and Chlorine Control. 7th ed. ANON. Published by W. A. Taylor & Co., Baltimore 4, Md., 1945. 87 pp., 30 figs. Free.—This completely revised edition of the Taylor combination handbook and catalog contains both simple and technical explanations of the meaning of pH control; specific discussions of the application of pH, chlorine, and phosphate control to 35 industries; the precautions to be observed in making determinations; and descriptions of all Taylor outfits, including 8 new sets.

PATENTS

Clay settling, centripetal reaction concentrator and amalgamator. F. E. MAYNARD. U. S. 2,385,094, Sept. 18, 1945 (Nov. 15, 1943). 12 claims. Cl. 209-422.

Electrical resistor. ERNST HEDIGER AND W. E. SCHILDHAUER (Carborundum Co.). U. S. 2,385,702, Sept. 25, 1945 (Sept. 24, 1942). 16 claims. Cl. 201-67.—1. An electrical resistor comprising a resistance core of electrical conducting material in a rigid jacket surrounding the core, metal caps on the ends of the resistor making electrical connection with the resistance core, and a vitrified glaze on the outside of the jacket adjacent to the caps and extending over the inner ends of the caps and making an airtight joint with the caps, the glaze being of substantially the same thermal coefficient of expansion as the metal caps.

Hollow form. R. W. HEMPHILL (Colonial Insulator Co.). U. S. 2,384,741, Sept. 11, 1945 (Nov. 16, 1944). 4 claims. Cl. 18-41.

Kilns, Furnaces, Fuels, and Combustion

Anthracite duff for brickfiring. G. E. GLOSSOP. *Brit. Clayworker*, **52** [612] 4 (1943).—It is not generally known that brick can be fired with anthracite duff. Although it is flameless, or nearly so, and is of low volatile content, it has been successfully used with automatic stokers. The amount of unburned material is practically nil, as this

kind of fuel burns while suspended in the air, and the resulting absence of clinker and blocked trace holes lengthens the life of the kiln by insuring plenty of air space for fire travel and draft. The automatic stoker is economical in manpower and can be adjusted to give a light or heavy feed as required. Power is supplied by a 1.5-h.p. motor, and if the current should go off during the unattended periods between the day and night shifts, the heat lost can easily be regained by increasing the feed. G. claims a 10% saving in production costs by the use of anthracite duff and automatic stokers. A typical analysis of the duff is as follows: moisture 2.5, volatile 8.5, ash 9.6, and F.C.M. 79.4%; calorific value, 13,530 B.t.u.; fusion temperature of ash, 1300°C. Coal consumption is 4.5 cwt. per 1000 brick. L.C.C.

Building a continuous kiln. ANON. *Brit. Clayworker*, **54** [638] 58–59 (1945).—A general account is given of good and bad practice, involving critical examination of such factors as length, thickness of masonry, damp foundations, strength and shape of arches, protection of the roof from weather, design of doorways and dampers, construction of "smoking apparatus" and chimneys, setting of the goods, and the proper utilization of the chambers. A kiln built at cut cost will prove a false economy, owing to consequent wastage of fuel and the proportion of second-quality goods turned out. L.C.C.

Case for the mechanical stoker. J. P. LAUDER. *Eng. & Boiler House Rev.*, **59** [7] 176–79 (1945).—Advantages of a suitably applied mechanical stoker over a manually operated stoker are seen in increased thermal efficiency, higher rate of steaming of the boiler, use of cheaper grade of fuel, reduction of smoke and grit, and reduction of labor costs, especially in large plants. With a boiler for 7616 lb. of steam per hr., the efficiency was increased from 60 to 70%, and the evaporation per lb. at 212°F. increased from 6.8 to 8; coal consumption dropped from 1300 to 1097 tons per year. M.HA.

Discussion of "Molecular nature of coking coal bitumens." JOSEPH BROWN ET AL. *Inst. Fuel War Time Bull.*, **1945**, Aug., pp. 250–51.—4 references. See *Ceram. Abs.*, **24** [10] 188 (1945). D.G.P.

Discussion of "Thermal insulation as applied to pottery furnaces, kilns, and carbonizing plant." G. N. CRITCHLEY ET AL. *Jour. Inst. Fuel*, **18** [103] 187–93 (1945).—1 fig. See *Ceram. Abs.*, **24** [10] 182–83 (1945). D.G.P.

Flow of air and gas in vertical flue coke ovens. GEORGE A. DAVIS. *Blast Furnace Steel Plant*, **33** [5] 567–78 (1945). —D. gives a theoretical, mathematical analysis of distribution of pressures and flow with the regenerators and flues. B.L.

Fuel conservation program (1945). ANON. *Amer. Artisan*, **114** [7] 56–63, 128 (1945).—Four tables give the combustion efficiency of coal, oil, and gas. Charts show curves for output vs. interval between boiler cleanings, heat losses vs. various types of domestic insulation, and filter performance vs. time in service. E.P.M.

Fundamentals of combustion in small underfeed stokers. B. M. THORNTON. *Eng. & Boiler House Rev.*, **59** [9] 244–48 (1945).—From a general discussion of the processes going on in an underfeed stoker, conclusions are drawn for successful practical operation and design. M.HA.

Increasing kiln output. ANON. *Brit. Clayworker*, **54** [637] 36 (1945).—The most serious drawback to the production of more brick in existing works is the low output of many continuous kilns, which could be doubled or trebled after necessary alterations. Small output can also be traced to unwillingness to spend capital on erecting specially designed kilns. A well-designed tunnel kiln or zigzag kiln can fire brick at about eight times the rate usual with the ordinary continuous kiln, and the reasons for this difference must be properly understood before the continuous kiln can be used for maximum production. (1) Drying to 120°C. usually occupies 3 days, but a drier is quicker and cheaper. (2) Many kilns are too short to be efficient and can usually be lengthened, e.g., from 144 ft. to 250 ft. The fire can then be made to travel at a proper rate, which may be 3 to 8 times its previous speed. (3) An increased draft is required to effect the necessary rate of fire travel. If the length and draft are correct and the kiln is in good condition and supplied with dry brick there should be no difficulty in making the fire travel at 18 in. per hr. The output may thus be raised to at least three times its former level. L.C.C.

Influence of sulfur oxides on the luminosity of coal-gas flames. G. WHITTINGHAM. *Nature*, **156** [3955] 207 (1945).—When sulfur dioxide was added in small quantities to a luminous smoky flame, the luminosity decreased and completely disappeared after about 5% by volume of sulfur dioxide had been added. The flame showed a purple color, and when a cooled funnel was held above the flame a yellowish-white deposit of sulfur collected. Spectroscopic examination of the flame revealed that a series of bands was present, apparently due to S_2 molecules. The addition of sulfur trioxide increased the luminosity of coal-gas flames. G.A.K.

Kiln foundations. ANON. *Brit. Clayworker*, **54** [637] 33–34 (1945).—It is of the utmost importance that the foundations of continuous kilns be well laid. Damp or porous ground will prevent a kiln from working at full speed, no matter how perfect the construction of the kiln itself. The type of foundation known as "English" extends to 40 in. below ground level and consists (in inches) of plastic clay 8, sand 2, engineering brick (two courses) 6, covering course 3, plastic clay 1, sand 14, and pitching course 6. The engineering brick should form a series of small flues, which act as heat insulators. This type of foundation may be regarded as too costly, but with the present high cost of coal the waste due to damp foundations is considerable, sometimes more than 1 cwt. per 1000 brick. Drainage of the ground should be carried out if more than a small amount of water is likely to collect below the foundations. L.C.C.

Kiln sizes. ANON. *Brit. Clayworker*, **54** [637] 38–39 (1945).—The size of kilns for firing common and face brick is of great importance in relation to fuel economy. The average fuel consumption of a round downdraft kiln 20 ft. in diameter is about 2.5 cwt. per ton of goods, corresponding to 8 cwt. per 1000 brick. In small kilns the fuel consumption may be considerably greater, and in some of the larger ones it may be reduced to as little as 6 cwt. per 1000. With the larger kilns, additional economy results from reduced cost of setting and quicker firing. Against these factors must be set the extra cost of repairs to large kilns, increased liability to injury, and a higher proportion of inferior brick due to difficulty of control. It is generally considered that a reasonably long life and a not excessive repair bill is attained by a downdraft kiln of about 25-ft. diameter, or slightly less (about 20 ft.) where particularly even heating is required. The kiln height is important and depends on the kind of goods to be fired. The shrinking and vitrification properties of the clay must be studied in relation to the setting height. In general, for effective and uniform firing, a fairly high arch or crown should be used, and this should form part of a semicircle, not an oval. If kept empty, the arch space affords plenty of room for the attainment of good oxidizing conditions, and the arch itself reflects the hot gases evenly among the goods. For engineering brick or other goods which need a reducing flame, a shallower arch and less clear space are required. Other factors which affect the proper working of kilns include the size and placing of the fireboxes and control of the temperature of the flue gases. L.C.C.

Luminous flame in industrial furnaces. FRITZ HERNING. *Gas* [Düsseldorf], **14**, 133–37, 147–50 (1942); abstracted in *Chem. Zentr.*, **1943**, I [2] 234.—The infrared gas radiation of CO_2 and H_2O is increased by using luminous flames with effective transmission of the heat energy of the fuel by direct action on the material to be heated and directly over the heating area of the combustion chamber. The nature and generation of luminous flames and the increase of the flame intensity by the transformation of methane are explained, and practical conclusions for gas-fired industrial furnaces are drawn. M.HA.

Proximate analysis of coal and its application. C. S. DARLING. *Blast Furnace Steel Plant*, **31** [5] 542, 544–45

(1943).—Suggestions are made for the analysis of coals and the prediction of performance from the results. B.L.

Sulfurous coal and its effect on color. ANON. *Brit. Clayworker*, **54** [638] 61 (1945).—Clayworkers prefer coal that burns with a long flame and so distributes its heat evenly through the kiln. Such coal often contains a high percentage of sulfur, chiefly due to pyrites, and on burning may be objectionable. It may also be liable to spontaneous combustion on storage. The effect of sulfur on the color of clay goods may be marked, and suitable precautions must be taken. The critical period is in the smoking or early fire, where SO_2 and SO_3 may combine with moisture, forming acids which act on the clay and cause a scum which may entirely prevent the development of the proper color. If heat from cooling chambers is not available, smoking must be carried out with coal as free from sulfur as possible. With S-free coal, smoking need not be carried beyond 200°F., but with coal containing 3% S, it is not safe to pass to full fire until 280°F., preferably 300°F. At this point damage from sulfur is almost impossible. The composition of the clay will indicate in what way sulfurous coal will affect the color; lime-rich clay, which normally burns buff, may give a red finish, and red-burning clay may produce grayish, greenish, or white effects. It is possible to overcome the effects of sulfurous coal by alternate use of an oxidizing and a reducing atmosphere, and with proper management of this difficult operation, even color may be attained. For success, reduction of sulfates must be completed before a temperature of 1800°F. is reached. Under these conditions it is possible to use fuel containing a high proportion of S with good results, but the cost of constantly changing the firing and of waste of fuel involved by smoky heating will usually be greater than that of using a better-class fuel. L.C.C.

Temperature control of heat-treatment furnaces. E. E. COOK. *Inst. Fuel War Time Bull.*, **1945**, Aug., pp. 237–44, 251, 279.—Detailed descriptions are given of the millivoltmeter and potentiometric types of thermoelectric pyrometers and of automatic temperature-control units for fuel-fired and electric furnaces, including multiposition, floating, proportional, floating proportional, and program or time-cycle control. In selecting the type of controller required, the plant characteristics and the type of valve movement most suited to the process under control must be considered, together with a determination of the permissible variations in temperature. Furnace characteristics needing study are uniformity of loading, variations in fuel supply, time lag or plant response, frequency of change of conditions, and permissible manual readjustment of control settings. Discussion. 14 figures. D.G.P.

Thermostatic control as an aid to efficiency in fuel utilization. A. L. LONGWORTH. *Inst. Fuel War Time Bull.*, **1945**, Aug., pp. 266–77.—Principles of control, classification and examples of equipment, characteristics of performance, selection of suitable controls, adjustment, and maintenance are discussed. Drawings of a radiation pyrometer, resistance thermometer, and on-off pyrometer controller are included. Discussion. 24 figures, 2 diagrams. D.G.P.

PATENTS

Mechanical stoker for kilns and their mountings. F. M. MILLER, A. C. SHAPE, AND W. H. MCCLELLAND (General Refractories Co.). U. S. 2,384,762, Sept. 11, 1945 (May 29, 1943). 2 claims. Cl. 110-32.

Melting of glass, enamel, silicates, basalt, etc. UNION DES VERRERIES MÉCANIQUES BELGES SOC. ANON., GEORGES HENRY, AND EDGAR BRICHARD. Fr. 876,569, Nov. 10, 1942 (Nov. 3, 1941); abstracted in *Chem. Zentr.*, **1943, I** [14] 1505.—Flames are introduced into the melting bath under pressure and at a velocity of more than 30 m./sec. M.HA.

Geology

Andalusite in India. N. L. SHARMA. *Trans. Indian Ceram. Soc.*, **3** [1] 53–55 (1944).—This described aluminum silicate mineral has been found in India, Burma, and Ceylon only as a normal constituent of some of the metamorphic and granitic rocks. The detailed locations are given for deposits at Bengal, Bihar, Burma, Central Provinces, Eastern States Agency, Hyderabad State, Madras, and Rajputana. Andalusite shows small volume change in dissociation into mullite and is usually molded into final form and fired directly without being precalcined. No andalusite deposit of commercial importance has been so far discovered in India, but at Singhbhum is one of the largest deposits of kyanite in the world (worked now merely for export), and the large quantities of sillimanite at Assam and Rewah hold promise for development of a large scale refractory industry of aluminum silicate. M.E.P.

Anhydrite in India. N. L. SHARMA. *Trans. Indian Ceram. Soc.*, **3** [1] 49–50 (1944).—In describing and locating the Indian anhydrite and its closely associated gypsum as found on the Salt Range (Punjab), it is noted that the formerly named "semianhydrite" is really a mixture of anhydrite and gypsum, that this mixture has been found to be as effective as pure gypsum as a retarder of Portland cement, and that while there is no possibility of the mineral anhydrite being mined separately from gypsum, the deposits in the Punjab will be worked extensively to serve the expanding building industry and as a raw material for the establishment of a sulfur industry. M.E.P.

Application of controlled dispersion to the textural grading of soils. JOSUÉ GOLLAN, JR., AND MARIO R. CODONI. *Soil Sci.*, **55**, 417–26 (1943).—The preparation of soil samples for mechanical analysis and the subsequent classification into fractions according to size are carried out in different ways, depending on whether the investigation is concerned with agronomy, engineering, or pedology. In pedologic studies a preliminary treatment is necessary to break down the aggregates and liberate as completely as possible the particles smaller than 2 μ in diameter; the classification will then give, as nearly as possible, the actual content of particles of the various sizes. The content of particles less than 2 μ in diameter can be determined most accurately. Experimental conditions that must be met in the adequate preparation of soil samples for mechanical analysis are described in detail. Results of investigations on soil colloid dispersion and oxidation of organic matter, as well as the experimental technique developed from these investigations, are given. Direct and indirect control methods are described for determining the degree of separation and cleansing of the particles and for evaluating the results obtained. 7 references, 8 figs. E.W.R.

Cattierite and vaesite: new Co-Ni minerals from the Belgian Congo. PAUL F. KERR. *Amer. Mineralogist*, **30**, 483–97 (1945).—The group that includes CoS_2, NiS_2, and FeS_2 forms an isostructural series following the pyrite lattice. Heretofore, the formation of the artificial end members has been established, but approximations to CoS_2 and NiS_2 have not been found in nature. At the Shinkolobwe mine in the Belgian Congo, CoS_2 having a pyrite structure is now known. To this mineral is assigned the name *cattierite*. Material approaching NiS_2 in composition and having a pyrite type of lattice has been found in the Kasompi mine of the Belgian Congo. This mineral is tentatively called *vaesite*. The lattice constants for the natural end members of the series in angstrom units are pyrite 5.40667 ± 0.000007, vaesite 5.66787 ± 0.00008, and cattierite 5.52346 ± 0.00048. The minerals are named after important contributors to the mineral development of the Belgian Congo. The four members of the pyrite series would be vaesite, cattierite, bravoite, and pyrite. 23 references, 2 figs. W.D.F.

"Chalky" versus "limy" clay. ANON. *Brit. Clayworker*, **54** [636] 15 (1945).—Clays containing particles of limestone larger than $^1/_{24}$ in. possess properties associated with limy clay and are rightly so called. Particles above a certain size are objected to, and the limit may be provi-

sionally fixed at $^1/_{32}$ in. Chalk particles are either smaller than this or are readily reduced in size by the ordinary brickmaking process. Chalky clays can therefore be regarded as harmless, and limy clays as objectionable. Chemical composition may be misleading, as in the case of glacial drift clays, where the only difference in two deposits may lie in the size of the limestone particles, one deposit being harmless and the other dangerous. It would be desirable to confine the term "limy" to clays containing particles of limestone larger than $^1/_{32}$ in. Clays containing much smaller particles of either limestone or chalk could then be designated as "chalky" clays. This distinction would indicate the fact that the first class of clay is undesirable as a brickmaking material, while the second may prove excellent. L.C.C.

Classification of central African rocks consisting of quartz, plagioclase, and biotite. E. POLINARD. *Natuurw. Tijdschr.*, **24,** 171–76 (1942); abstracted in *Chem. Zentr.*, **1943, I** [5] 499.—Mineralogically, the rocks investigated form a very homogeneous family. K feldspar of normal crystal size is entirely absent, and the plagioclase that is closely related to andesine and labradorite contains 38 to 60% anorthite. The biotite of green or brown variety originates from the transformation of pyroxene or amphibole. Feldspar predominates over quartz. M.HA.

Concentration of barite-fluorite ores from the Lake Ainslie District, Nova Scotia. E. LEE CAMERON. *Trans. Can. Inst. Mining Met.*, **48,** 567–87 (1945).—Bulk samples of ore from old mine workings on four barite-fluorite veins were tested in the Ore Dressing Laboratories, Bureau of Mines, Ottawa. There are two types of ore: one is amenable to concentration, but because of the high barite to fluorite to calcite ratio, a fluorite concentrate was not obtainable from the other. A blend of the two types gives a suitable mill feed. G.M.H.

Crystallography of cristobalite from Ellora Caves, India. C. W. WOLFE. *Amer. Mineralogist,* **30,** 536–37 (1945).—The crystals were simple octahedrons, and about half showed octahedral penetration twinning. The faces were etched and gave multiple signals, so it was impossible to suggest any other system than the isometric. The quartz paramorphs were also octahedral with less perfect faces. See "Octahedral. . .," p. 210. W.D.F.

Determination of exchange capacity and exchangeable bases in soil—ammonium acetate method. C. J. SCHOLLENBERGER AND R. H. SIMON. *Soil Sci.*, **59** [1] 13–24 (1945).—The authors present evidence in favor of the use of ammonium acetate as a leaching solution and describe suitable apparatus and sample preparation. The ammonium acetate is made up quite carefully and has a pH of 7. The exchange capacity is determined by analysis of the leached soil for ammonium, corrected for exchangeable ammonium contained in the soil and for carbonate dissolved during leaching. Analytical methods for determining the extracted, and hence exchangeable, cations in the leachate are given. These include hydrogen, aluminum, manganese, calcium, magnesium, potassium, and sodium. 14 references. E.W.R.

Dolomite. C. MAHADEVAN. *Trans. Indian Ceram. Soc.*, **4** [1] 23–39 (1945).

Eclogite inclusion from the Cape Paterson volcanic neck in South Gippsland, Victoria. GEORGE BAKER. *Amer. Mineralogist,* **30,** 505–509 (1945).—True eclogite rocks are scarce in Victoria, being known only as occasional fragments that have been carried up to the surface by Tertiary volcanic eruption. The example recorded is of interest because of its simple mineral composition (garnet and omphacite), because of the fresh state of preservation of its primary constituents, and because of the occurrence of almandine spinel in the occasional narrow kelyphitic zones bordering some of the garnet crystals. 12 references, 1 fig. W.D.F.

Effect of migration of clay minerals and hydrous aluminum oxides on the complexity of clay. VICTOR T. ALLEN. *Jour. Amer. Ceram. Soc.*, **28** [10] 265–75 (1945).—13 references, 11 figures.

Factors influencing aggregation of claypan soils. F. G. ACKERMAN AND H. E. MYERS. *Soil Sci.*, **55,** 405–13 (1943).—This study includes the determination of the degree of aggregation, the percentage of nitrogen and organic carbon, and the lime requirement of the soils of both cultivated and grass plots on two claypan soils of southeastern Kansas. Differences in degree of aggregation, apparently due to the influence of the kind of crops grown, proved to be highly significant by statistical analysis. Within the limits of this study, the possible effect of organic carbon, nitrogen, carbon-nitrogen ratio, or lime requirement on soil aggregation was overshadowed by the influence of the different crops grown. Results support the contention that lime, as a direct factor in aggregation, is relatively unimportant. 23 references. E.W.R.

Genesis of a claypan soil: I. C. C. NIKIFOROFF AND M. DROSDOFF. *Soil Sci.*, **55,** 459–82 (1943).—The authors describe a method for interpreting data obtained by soil analyses and present, in the light of this method, the results of an investigation of a claypan soil, Dayton silt loam, with particular reference to the origin of the claypan. Interpretation of the results of soil analyses is difficult because in most instances the exact composition of the original material in each soil horizon is not known and also because of the concurrence of various processes in the same horizon (as migration and segregation). The data obtained by soil analyses show the summary result of all these processes without sufficient, if any, information about the specific result of each individual process. The authors have developed a method of analyzing mathematically the data obtained in order to ascertain the extent to which these various processes have taken place. The method consists of the following calculations: (1) The data obtained by analyses are expressed in exact percentages of the material free of any incorporated substances, such as humus, combined water, or free carbonates. (2) The data obtained by the first calculation are recalculated upon a parent material quotient (Q). (3) The data obtained by the second calculation are recalculated upon a volume factor (v). (4) The data obtained by chemical analysis and corrected by the first calculation are recalculated upon a basis obtained by mechanical analysis previously recalculated upon Q. Q is obtained by selecting some constituent in the soil that does not migrate and dividing the percentage of this constant constituent in the original material (before any soil processes such as migration and segregation have taken place) by the percentage of the same substance in the modified material. The volume factor is a correction factor applied to take care of the differences in thickness of the various horizons in the soil profile. The morphology and mechanical and chemical composition of the Dayton silt loam are given in detail, with a few calculations on the analyses to indicate the methods of calculation. The detailed application of the methods to this soil are given in Part II (*Ceram. Abs.*, **24** [5] 97 (1945)). E.W.R.

Kyerwa tin deposits, Tanganyika Territory, and their beneficiation by dry blower. C. T. SWEET. *Bull. Inst. Mining & Met.*, No. 471, p. 19 (1945).—Contributed remarks. L.C.C.

Lattice constants in the pyrite group. PAUL F. KERR, RALPH J. HOLMES, AND MARGARET S. KNOX. *Amer. Mineralogist,* **30,** 498–504 (1945).—A symmetrical back reflection focusing powder camera was used to compare lattice constants for minerals corresponding to NiS_2 and CoS_2 in the pyrite group with pyrite. A cobalt sulfide from the Shinkolobwe mine in the Belgian Congo gives $a_0 = 5.52346 \pm 0.00048$ a.u. A high-nickel specimen from the Kasompi mine in the Belgian Congo gives $a_0 = 5.66787 \pm 0.00008$ a.u. Pyrite from Leadville, Colo., yields $a_0 = 5.40667 \pm 0.00007$ a.u. 11 references, 3 figs. W.D.F.

Lithium from Searles Lake. W. A. GALE. *Chem. Industries,* **57** [3] 442–46 (1945).—G. describes the Searles Lake deposits, the properties of lithium, the preliminary development of the deposits, and the Trona separation process now in use. Lithium is used in radio and fluorescent light tubes, welding fluxes, optical lenses, Edison-type storage batteries, air-conditioning equipment, ceramics, alloys, glasses, as a carrier of hydrogen to inflate life raft antenna balloons. and as a degasifier in metallurgy. Lith-

ium is recovered primarily by a flotation process. Production in the U. S. in 1943 was 8185 tons valued at $314,660. 7 illustrations. E.D.M.

Marl in Peterborough County. D. C. McLaren. *Can. Mining Jour.*, **66** [9] 603–608 (1945).—Chem-Ore Mines, Ltd., Toronto, has started to produce marl about 12 miles from Bobcaygeon, Ont. There is an estimated 1.5 million tons of amorphous calcium carbonate with a maximum thickness of 80 ft. The deposit is covered by lake water and is the result of precipitation through the action of algae. In drying the material, 840 infrared lamps are used in conjunction with steam tables. Production is expected to be between 50 and 80 tons per day. G.M.H.

Memories of 20-mule-team days. C. H. Vivian. *Compressed Air Mag.*, **50** [9] 232–36 (1945).—V. reviews the history of borax production in the U. S. from its discovery in 1856 in Little Borax Lake, Calif., to the present. Numerous deposits and workings are described, and production figures and uses are listed. Extensive deposits still await exploitation. 4 photographs. One map. M.B.

Mineral industry of Nova Scotia. J. P. Messervey. *Can. Mining Met. Bull.*, No. 400, pp. 395–98 (1945).—The continuation of the large output of the coal industry depends to a great extent on the adoption of a national fuel policy by the Dominion. During 1944 some calcined diatomite was shipped from a huge deposit in Digby County; other deposits are being investigated by the Government. There is appreciable production of building brick, sewer pipe, and tile. Barytes at Walton is enjoying expanded production. Fluorspar at Trout River is being investigated. There is a small production of silica sand at Melford. See "Some. . . ," *Ceram. Abs.*, **24** [1] 24 (1945). G.M.H.

Montmorillonite. A. N. Winchell. *Amer. Mineralogist*, **30**, 510–18 (1945).—Montmorillonite (including nontronite) probably varies in composition between the following end-member formulas: $4(Al,Fe)_2O_3 \cdot 16SiO_2 \cdot 20H_2O$, $6(Al,Fe)_2O_3 \cdot 12SiO_2 \cdot 22H_2O$, $6MgO \cdot 3(Al,Fe)_2O_3 \cdot 12SiO_2 \cdot 25H_2O$, and $6MgO \cdot 2(Al,Fe)_2O_3 \cdot 14SiO_2 \cdot 24H_2O$. These variations are shown on a partial triangular prism on which 52 analyses are plotted. The optical properties vary little except with variations in the Al–Fe''' series. 52 references, 6 figs. W.D.F.

Octahedral cristobalite with quartz paramorphs from Ellora Caves, Hyderabad State, India. A. Van Valkenburg, Jr., and B. F. Buie. *Amer. Mineralogist*, **30**, 526–35 (1945).—The vesicles found in a basalt contain layered quartz inverted from cristobalite with fibers of mordenite projecting from the basalt through and above the quartz. Attached to the free mordenite fibers are well-formed twinned octahedrons of cristobalite, some of which had inverted to quartz. The crystals contain either one or the other mineral. The cristobalite crystals are uniaxial negative, $\epsilon = 1.4862$ and $\omega = 1.4841$; $G = 2.382$. The optic axes of cristobalite parallel one of the octahedral diagonals; those of quartz have a scattered orientation. Mordenite fibers formed first in the vesicles. Later, or contemporaneous with mordenite, a layer of massive cristobalite deposited, along with crystals attached to the mordenite fibers. Inversion of the massive cristobalite followed, and some of the crystals followed. The unusual occurrence of cristobalite perched on mordenite indicates that cristobalite formed as an unstable mineral with temperatures not far from 300° to 400°C. 4 references, 8 figs. W.D.F.

Raw material basis of the kaolin industry of the Urals. N. S. Faĭnshteĭn. *Sovet. Geol.*, **1941**, No. 3, pp. 95–97; abstracted in *Chem. Zentr.*, **1943, I** [2] 197.—There exist in the Ural mountains considerable deposits of high-grade kaolins, which are equal in quality to the Ukrainian kaolins and in sufficient quantities to cover consumption completely. The richest deposit and the best quality of kaolins are those of Kochkarsk which, however, suffer from transportation difficulties. M.Ha.

Recent analyses and tests of a Kenya diatomite. Anon. *Bull. Imperial Inst.*, **43** [1] 55–58 (1945).—In an endeavor to determine the value of the rock, the Mining and Geological Department of Kenya examined and carried out tests on a deposit of diatomite situated in the valley of the River Kariandus near Gilgil. G.A.K.

Structure of clays and its importance for coarse ceramics. Alfred H. Stutz. *Schweiz. Tonwaren-Ind.*, **45** [6] 1–3; [7] 1–3; [8] 4–5; [9] 3–6; [10] 3–4; [11] 1–3 (1942); abstracted in *Chem. Zentr.*, **1943, I** [10] 1094.—An exhaustive discussion of the origin of clays, clays as a grain mixture, the plastic clay minerals, colloid chemistry of clays, and the chemism of the brick clays is presented. M.Ha.

Symposium on quartz oscillator plates: Geology of quartz crystal deposits. Richard E. Stoiber, Carl Tolman, and Robert D. Butler. *Amer. Mineralogist*, **30**, 245–68 (1945).—Most quartz comes from Brazil. Other countries with deposits are the U.S.S.R., Australia, Guatamala, Colombia, and Madagascar. Radio-grade quartz has been found in Arkansas, California, North Carolina, and Virginia. The geology of quartz in Brazil is as follows: (1) Deposits occur in four widely separated, roughly parallel belts. (2) They are in Paleozoic sedimentaries only slightly folded. (3) Deep weathering is a characteristic. (4) Deposits in bed rock are quartz veins or blanket deposits paralleling the bedding. (5) Only a few minerals in small amounts are associated; these are a manganese oxide, chlorite, and a limonite stain. (6) Veins are unrelated to other mineralization. (7) The deposits yield only quartz. (8) Usually single deposits produce less than 500 lb. per month of usable crystals. Relative production of the Brazilian states is Minas Geraes 35, Goiás 30, Bahia 20, Espirito Santo 5, and others 10%. Other deposits of quartz resemble the Brazilian deposits in a general way except those in Australia. 12 figs. **Inspection and grading of quartz.** Samuel G. Gordon. *Ibid.*, pp. 269–90.—To be usable for radio-frequency oscillators, a quartz crystal must have part of its volume free of twinning and detrimental inclusions. Dauphiné (electrical) twinning may sometimes be detected on the surface of the crystal or by etching crystals or sections. Brazil (optical) twinning, intergrowths of right and left quartz, is easily detected by viewing a crystal immersed in oil and between crossed Polaroids in the direction of the optic axis. An oil bath, so set up, has been called a quartz inspectoscope. It also permits the quartz to be scanned in an intense beam of light for cracks, bubbles, inclusions, and the inexplicable oriented linear clouds in V-shaped clusters called "blue needles." The apparatus is useful not only for grading quartz for usability but for inspections of sections, bars, wafers, and blanks to avoid useless processing. A portable field model, using sunlight, is described. An example of the rare type of twinning according to the "combined laws" is illustrated. 35 figs. **Secondary Dauphiné twinning in quartz.** Clifford Frondel. *Ibid.*, pp. 447–60.—Dauphiné twinning (so-called electrical twinning) can be produced artificially in quartz (1) by cooling beta-quartz down through the 573°C. inversion point to alpha-quartz, (2) by rapid cooling of alpha-quartz down from roughly the 200° to 550°C. range, and (3) by local application of high pressures at room temperature or higher. Secondary twinning produced below 573°C. is not accompanied by a permanent geometrically defined distortion of the crystal and is distinct from twin gliding produced by mechanical deformation. Additional types of secondary twins can be produced artificially by superimposing Dauphiné twinning upon other types of twins already present. The strategy of detwinning Dauphiné twinned oscillator plates is based on heating the quartz over the inversion point to beta-quartz, in which the Dauphiné twinning cannot exist by reasons of symmetry, and controlling the cooling conditions so that reinversion proceeds from one center rather than many. Natural Dauphiné twinned oscillator plates homogenized by heating over 573°C. show a "memory" phenomena in which both the incidence and distribution of the secondary twinning that reappears on cooling are influenced by the original twinning. Secondary Dauphiné twinning in oscillator plates usually exhibits a regular pattern dependent on the orientation and outward shape of the plate. Both cracking and secondary twinning in quartz originate in cooling

stresses and are primarily influenced by the rate of heating and cooling and by the size of the piece of quartz. While both effects are favored at 573°C., neither is necessarily a concomitant of or indicative of inversion from beta-quartz. The conventional criteria for the distinction of natural alpha- and beta-quartz are criticized adversely in this connection. An added criterion of origin based on three-foldedness in areal distribution of natural Dauphiné and Brazil twinning is discussed. 10 references, 8 figs. See also this page and p. 205. W.D.F.

Trend of phosphate adsorption by inorganic colloids from certain Indiana soils. L. E. ALLISON. *Soil Sci.*, **55,** 333–42 (1943).—The colloids were isolated by sedimentation and were electrodialized to remove all mobile ions. The curves of phosphate adsorption over the pH range 3.0 to 8.0 exhibit characteristic peaks and depressions. The first peak of adsorption occurs at pH 3.0 to 3.5 and is believed to be due mainly to the hydrated forms of iron. A second agency, most active over the pH range 5.5 to 6.5, accounts for a second adsorption peak at approximately pH 6.0. The adsorption at this reaction is undoubtedly due to aluminosilicate clay minerals by anion exchange similar to that obtained by Scarseth for montmorillonite, i.e., a bentonitic type of adsorption. Between the two adsorption maxima at pH 3.0 and 6.0, a much lower adsorption occurs at pH 4.5, apparently due in part to each of the aforementioned agencies. Within the reaction range of most arable (podzolic) soils, pH 5.0 to 7.0, the bentonitic type of phosphate adsorption (fixation) by anion exchange plays an important role. Although most of the phosphate in soils is adsorbed by the two agencies mentioned, exchangeable calcium is indicated as an important factor in retaining appreciable amounts of phosphate in acid soils in probably the most available of all its fixed forms, i.e., the $H_2PO_4^-$-Ca-micelle linkage. Evidence of retention in this form over the pH range 4.0 to 6.0, or higher, and of the extent of this type of retention is presented. 21 references, 1 fig. E.W.R.

SEPARATE PUBLICATIONS

Industrial Limestones and Dolomites in Virginia: New River–Roanoke River District. BYRON N. COOPER. *Virginia Geol. Survey Bull.*, No. 62, 98 pp., 1944 (1945).—This report is the first in a series describing the limestones and dolomites of present and potential commercial importance. It contains a discussion of those rocks along the Norfolk & Western and Virginian railroads between Roanoke and the West Virginia line. Useful features of the report are the detailed geologic sections, shown in graphic form as they appear in natural sections, and 94 chemical analyses of limestones and dolomites. A.C.B.

Solodized soils of the Red River Valley. C. O. ROST AND K. A. MAEHL. *Soil Sci.*, **55,** 301–12 (1943).—The authors studied the characteristics of samples from 17 profiles of intrazonal soils from the Minnesota portion of the Red River Valley. The soils were divided, on the basis of their morphological and chemical characteristics, into three groups consisting of 5, 6, and 6 profiles. The separation was made mainly on a chemical basis, the absence of soluble salts, pH, exchangeable cations, and soluble silica and alumina being the criteria. 19 references. E.W.R.

PATENTS

Beneficiation of beryllium ores. F. D. LAMB AND LLOYD BANNING (Government of the United States as represented by the Secretary of the Interior). U. S. 2,385,819, Oct. 2, 1945 (Sept. 13, 1943). 6 claims. Cl. 209-166.—1. A process for the beneficiation of beryl ores which comprises blunging a finely ground deslimed beryl ore in an aqueous caustic alkaline pulp, thereafter adjusting the pH of the mixture to approximate neutrality, then agitating and aerating the mixture in the presence of a frothing agent and a collector comprising a fatty acid having 8 to 18 carbon atoms, and separating a froth containing a beryl concentrate.

Chemistry and Physics

Determination of fluorine in minerals and bones. P. R. GODFREY AND C. L. SHREWSBURY. *Jour. Assoc. Official Agr. Chem.*, **28** [2] 335–38 (1945).—A procedure is described for the determination of fluorine. Improved apparatus facilitates the distillation and titration of fluorine. Results show an average deviation between samples of 3.6%. Recoveries of 95 to 99% fluorine from solutions of known content were obtained. G.A.K.

Determination of refractive indices of colloidal particles by means of a new mixture rule or from measurements of light scattering. W. HELLER. *Phys. Rev.*, **68** [1 and 2] 5–10 (1945).—A new theoretical mixture rule is developed for determining the refractive index of colloidal particles from differential refractometric measurements. The new rule gives better results for colloidal solutions than the mixture rules of Newton, Lorenz-Lorentz, or Wiener if the difference between the refractive indices of the colloidal particles and of the medium is small. If the difference is large but not in excess of 0.7, the refractive index of the particles can still be obtained with an accuracy in the third or fourth decimal place by using an empirical correction equation. If colloidal solutions are very opaque, the refractive index of the particles can be calculated from light scattering. Application of the respective equation requires that the refractive index of the medium and the size of the particles be known. The gravimetric and volumetric measurements involved in the determination of the density of colloidal particles can be replaced in part or entirely by measurements of light scattering and refractivity. G.A.K.

Heat content of manganese at high temperatures. B. F. NAYLOR. *Jour. Chem. Phys.*, **13** [8] 329–32 (1945).—Heat contents above 298.16°K. of two samples of electrolytic manganese were determined from room temperature to about 1440°K. From these data three transitions occurring at 1000 ± 2°, 1374 ± 5°, and 1410 ± 5°K. with heat effects of 535, 545, and 430 cal. per gm.-atom, respectively, were observed. Smooth curve values at 100° intervals and corresponding entropies are given as well as heat content and specific heat equations for the four modifications of manganese. A specific heat equation for γ-manganese was derived for the temperature range 298° to 1374°K. from low temperature and high temperature thermal data, and corresponding heat contents and entropies above 298.16° for γ-manganese were calculated. G.A.K.

Symposium on quartz oscillator plates: Effect of radiation on the elasticity of quartz. CLIFFORD FRONDEL. *Amer. Mineralogist*, **30,** 432–46 (1945).—When quartz is exposed to X rays, gamma rays, electron beams, alpha particles, or deuterons it becomes smoky in color, the rate of solution in hydrofluoric acid is decreased, and the elastic constants are altered. The effect of radiation on the elastic properties is revealed by study of irradiated quartz oscillator plates. In general, the oscillation frequency decreases continuously to a limiting value, and types of plates dependent on different elastic constants are affected unequally. The effect is being utilized in manufacture to make the frequency adjustment of oscillator plates. The degree of response in color and elasticity is limited and varies among different specimens. Baking at temperatures over about 180°C. restores the original properties and conditions the response of the quartz on re-irradiation. Luminescence phenomena accompany both irradiation and baking and, together with the response in color and elasticity, are related to the original color and composition of the quartz. 12 references, 11 figs. See also this issue, pp. 205 and 210. W.D.F.

Titrative determination of the neutralization value of calcium silicate slags. W. M. SHAW. *Jour. Assoc. Official Agr. Chem.*, **28** [2] 310–35 (1945).—The A.O.A.C. titrative procedure for liming materials is not applicable

to the determination of neutralization value of the calcium silicate slags. This inadequacy prompted the attempt to evolve a rapid and dependable procedure for the determination of the calcium carbonate equivalence of such slags from both blast and phosphate furnaces. Preliminary studies established the fact that dissolution of 0.5-gm. charges of blast-furnace slags is completed by a 5-min. boiling in 35 ml. of 0.5 *N* acid. The proportion of 25 ml. of the acid to 0.5 gm., although carrying a 30% excess beyond the calcium-magnesium equivalence of most slags, did not effect the complete dissolution of slags of high aluminum content, even when the digestion was prolonged. By means of the glass electrode, potentiometric titration curves were obtained for guidance in the studies as to titration end point for blast- and phosphate-furnace slags. The transition points in the titration curves for blast-furnace slags did not register the equivalences computed from determined calcium + magnesium content. Titration curves for solutions of calcium silicate containing aluminum chloride demonstrated that the equivalence pH is governed by the ratio of SiO_2: Al_2O_3 in the titrated system. In general, the equivalence pH of the blast furnace slag solutions falls within the range of pH 4.8 to 5.4. Potentiometric titrations to pH 5.0 gave satisfactory results for experimental blast-furnace slags. Fluorine content is the chief cause of irregularity in the titration curves for phosphate-furnace slags, the equivalence pH of which develops in the region between pH 6 and 8, wherein the aluminosilicate precipitate exerts considerable cation sorption. A study of the indicators appropriate for the titration of blast-furnace slags showed that phenolphthalein gave a minus error of about 6% in calcium carbonate equivalence, in contrast to a plus error of 6 to 24% with the use of methyl orange. Titrations against bromocresol green to pH 5.2 gave only proximations of true values. Accuracy of the colorimetric readings of direct titrations was impaired by undissolved matter and by precipitates formed by the titratant. Two procedures are proposed to obviate both direct titration, technique, and complete analysis of slags. One procedure directs the dissolution of the slag in acetic acid, dehydration of silica and its elimination jointly with R_2O_3, evaporation of the acetate solution, ignition, and titration of the resultant calcine. The other prescribes dissolution in hydrochloric acid, joint elimination of silica and R_2O_3, evaporation of the filtrate with nitric acid, oxalate precipitation and ignition, and titration of the calcine. The first-mentioned procedure is especially applicable to slags that contain fluorides and phosphates and to slags in general when complete acetic acid dissolution of the charge is effected. The last-mentioned procedure was found appropriate for slags devoid of fluorides and phosphates. G.A.K.

BOOK

Mathematics of Physics and Chemistry. HENRY MARGENAU AND GEORGE M. MURPHY. D. Van Nostrand Co., Inc., New York, 1943. 581 pp. Price $6.50. Reviewed in *Chem. Industries*, **54** [1] 96 (1944).—The authors have covered the essentials of the mathematics that are needed by the modern physicist, chemist, and chemical engineer. As a text the book may be used as an introduction to the three basic subjects of physics and chemistry: thermodynamics, statistical mechanics, and quantum mechanics. The problems of polyatomic molecules, liquid and solid state are treated as well. The sections on differential equations, vector analysis, matrix algebra, group theory, linear integral equations, and numerical calculations are remarkable for their clarity and conciseness. E.D.M.

PATENTS

Magnesium silicates and process for making. REUBEN ROSEMAN AND HARRY EISENBERG (Charles H. Burton). U. S. 2,384,563, Sept. 11, 1945 (March 21, 1940). 2 claims. Cl. 23-110.—1. A method of preparing a magnesium silicate of definite chemical composition with a molecular ratio, $MgO:SiO_2$, within the range of substantially 1:3.1 to 1:4.3, comprising reacting a solution of magnesium sulfate with a solution of sodium silicate having the formula $Na_2O,3.3SiO_2$, the ratio moles $Na_2O,3.3SiO_2$/moles $MgSO_4 \cdot 7H_2O$ being within the range of substantially 0.5 to 2.0, and in the absence of treatment for further chemical reaction on the product of that reaction, thoroughly washing the precipitated magnesium silicate to free it essentially of contaminating constituents, drying the washed precipitate at a temperature not in excess of substantially 65°C., and pulverizing the dried silicate.

Manufacture of cuprous oxide. W. J. HARSHAW AND C. J. HARBERT (Harshaw Chemical Co.). U. S. 2,385,078, Sept. 18, 1945 (Oct. 14, 1944). 4 claims. Cl. 23-147.—4. A process of producing cuprous oxide from cupric oxide which comprises heating a mixture of cupric oxide and a reducing agent of the class consisting of sulfur and copper sulfide and mixtures thereof to a temperature between 650° and 1000°C., the proportions being 10 to 15 parts of reducing agent to 100 parts of CuO by weight in the case of sulfur and 24 to 30 parts of reducing agent to 100 parts of CuO by weight in the case of CuS, and proportionally in the case of mixtures, and the heating being carried out in a nonoxidizing atmosphere.

Preparation of red copper oxide. A. H. DU ROSE AND C. F. ROBISON (Harshaw Chemical Co.). U. S. 2,385,066, Sept. 18, 1945 (Oct. 18, 1944). 7 claims. Cl. 23-147.—7. A process of producing cuprous oxide comprising heating cupric oxide in an approximately neutral atmosphere with sulfur and carbon in the temperature range 650° to 800°C. until the major portion of the cupric oxide has been reduced to cuprous oxide, the proportions of cupric oxide, sulfur, and carbon, based on the combined weight of cupric oxide, sulfur, and carbon in the batch, being as follows: CuO, 91 to 95%; sulfur, 5.5 to 8%; carbon, 0.5 to 1.0%, and cooling the resulting product under nonoxidizing conditions.

Production of zirconia. M. O. AXT (F. W. Berk and Co., Ltd.). U. S. 2,384,428, Sept. 11, 1945 (June 10, 1942; in Great Britain Sept. 12, 1941). 5 claims. Cl. 23-140.—1. A process for the production of zirconia which comprises hydrolyzing a solution of zirconium sulfate containing no excess acid and free from alkali-metal salts in the presence of a substantial amount of a compound selected from the group consisting of calcium chloride and calcium nitrate but not sufficient to react with all the sulfate ions present and in the absence of a substantial amount of magnesium sulfate to precipitate a basic sulfate of zirconium and calcining the product thus obtained to produce zirconia.

General

Carnegie study of the libraries of technological colleges. THOMAS R. BARCUS. *Jour. Eng. Education*, **32** [5] 424–33 (1942).—Many colleges have inadequate libraries. E.W.R.

Changing field of employment and possible implications for curriculum adjustment. H. LOREN THOMPSON. *Jour. Eng. Education*, **21** [10] 774–82 (1941).—T. discusses the need for changes in the engineering curricula. E.W.R.

Course on experimental stress analysis. JOSEPH MARIN. *Jour. Eng. Education*, **32** [8] 631–39 (1942).—The course outlined is an attempt to offer a more general course on experimental methods than the work on photoelasticity given at many engineering schools or in courses on structural models offered in structural engineering curricula. 7 references. E.W.R.

Engineering aptitudes: their definition, measurement, and use. CLAIR V. MANN. *Jour. Eng. Education*, **32** [8] 673–86 (1942). E.W.R.

English in engineering—in college and after college. H. P. HAMMOND. *Jour. Eng. Education*, **32** [7] 596–601 (1942). E.W.R.

Essentials of cost control. JOHN A. WILLARD. *Jour. Eng. Education*, **32** [7] 548–65 (1942).—W. discusses the essentials of cost control from the viewpoint of the needs of

top management rather than from the viewpoint of an accountant. E.W.R.

Expansion of ceramic work at West Virginia University. ANON. *Bull. Amer. Ceram. Soc.*, **24** [10] 401 (1945).—1 photo.

Factors affecting the movement of materials through bins, gates, and feeders. W. G. BAUER. *Pit and Quarry*, **38** [2] 78–83 (1945).—B. limits his discussion to non-free-flowing conditions and materials. He touches upon wall friction, hesitant flow and arching, and bin construction with a fairly thorough treatment of feeders. 5 diagrams. M.R.

Glass-metal collaboration. KENNETH ROSE. *Sci. Amer.*, **173**, 168–70 (1945).—Many metal films on glass are made, some of which allow soldering of electrical connections to the films. When making stainless steel wire, thoroughly annealed metal is necessary and it must be free of surface oxides. A new method of annealing the wire uses a bath of molten glass at 1900° to 2300°F. and for 10 sec. to 3 min., depending on the type of steel. The wire is withdrawn, coiled, and allowed to cool. The glass coats the wire while it is at the temperature at which rapid oxidation occurs, but below this range the glass shatters and separates from the wire, taking any oxides with it. Godet wheels and glass pumps have metal inserts in glass. A new way of putting metal inserts in glass is called multiforming. Glass is powdered, formed in a mold with the metal insert in place, and then sintered at a relatively low temperature. 4 figs. See "Glass processing . . .," *Ceram. Abs.*, **23** [7] 122 (1944). W.D.F.

Forecasting the academic achievement of engineering students. CORNELIUS H. SIEMENS. *Jour. Eng. Education*, **32** [8] 617–21 (1943).—S. has derived formulas, using standard deviations, whereby the scholarship of an engineering student can be predicted with surprising accuracy. They have been useful in giving advice to borderline students, transfer students, etc. The method is an application of the Tolley-Ezekial method of handling multiple correlation problems. E.W.R.

Heat-exchanger characteristics. ANON. *Eng. & Boiler House Rev.*, **59** [9] 233–39 (1945).—The principles of heat-exchanger performance are discussed, and an analytical method is developed by which performance can be predicted and which can serve as a basis for the comparison of different apparatus. M.HA.

History of the Haeger Potteries, Inc. ANON. *Bull. Amer. Ceram. Soc.*, **24** [10] 355–57 (1945).—2 photos.

Industrial arts courses in the training of an engineer. E. L. WILLIAMS. *Jour. Eng. Education*, **32** [10] 807–809 (1942). E.W.R.

Modern cast iron—a new engineering material. J. B. GODSHALL. *Compressed Air Mag.*, **50** [9] 237–41 (1945).—Modern cast iron may be considered a new material because metallurgical research and engineering advances have improved its physical properties. There are an infinite number of cast irons, made with precision to give definite properties for specific purposes. Cast iron usually contains 1.7 to 4.5% C and 1.5 to 2.5% Si; its tensile strength may vary from 20,000 to 100,000 lb./sq. in., depending on composition and properties. The tensile strength is not materially reduced by temperatures up to 800°F. but above that point decreases rapidly. Some cast iron products have given good service above 1000°F. The chief disadvantage of cast iron is its brittleness; it is not suitable for applications involving severe thermal or mechanical shock, but it does possess a certain amount of flexibility. Cast iron's resistance to corrosion is closely related to the specific application; small additions of Ni, Mo, and Cr plus proper heat-treatment produce cast irons that are corrosion resistant. Malleableizing converts white-iron castings into malleable iron. One illustration, 9 photographs. M.B.

Mounting into window holders. M. LITWIN. *Ind. Diamond Rev.*, **5** [58] 209 (1945).—Mounting diamonds in "window" holders or nibs permits easy examination of the diamond die during drilling and also during use. The diamonds are held with maximum security during the drilling and wire-drawing operations. L. describes in detail the preparation of the diamond prior to setting, the diamond holder, the positioning of the stone, and the actual mounting of it. 3 diagrams. P.G.

Place of the technical institute graduate in industry. ARTHUR L. COOK. *Jour. Eng. Education*, **32** [5] 452–56 (1943).—Industry needs about three times as many men trained at the technical institute level as graduate engineers but has been slow to give proper encouragement and recognition to the technical institute type of training. In recent years there has been too much stress put on the possession of a degree. C. gives recommendations for a standardized curricula for evening technical institute courses. E.W.R.

Placement service. A. S. LEVENS. *Jour. Eng. Education*, **32** [9] 746–52 (1942).—L. discusses methods of obtaining not just placement but truly suitable positions for graduating engineering students. E.W.R.

Requirements for graduation beyond ordinary passing grades. C. A. KOEPKE. *Jour. Eng. Education*, **31** [10] 753–63 (1941). E.W.R.

Research department can promote mine efficiency. T. M. WATERLAND. *Eng. Mining Jour.*, **146** [7] 94–96 (1945).—Many mines do not realize that job standardization with close engineering control can be applied effectively to mining. One research department has developed a new type of detachable bit, a standard drilling round, and other such standard methods. Rock drills had been continuously repaired by putting in new parts; a careful analysis showed that much money could be saved if the machine was replaced when the cylinder was worn out; the explosives used were also decreased. 5 figs. W.D.F.

Responsibility of the engineering college for present chaos in industrial relations. T. W. PRIOR. *Jour. Eng. Education*, **32** [5] 467–71 (1942). E.W.R.

Science and technology in the engineering curricula. D. B. PRENTICE. *Jour. Eng. Education*, **32** [1] 13–18 (1941).—P. discusses the changes in science and technology in recent years and the resultant changes needed in engineering curricula. E.W.R.

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PATENTS

Improvement of the deformation properties of oxide masses or the castability of slips, in particular of slips or masses with high TiO_2 content. SIEMENS SCHUCKERTWERKE A.-G. (Wilhelm-Alexander Mohrberg, inventor). Ger. 726,701, Oct. 19, 1942 (Nov. 22, 1940); cl. 80*b*; abstracted in *Chem. Zentr.*, **1943, I** [14] 1506.—The improvement is brought about by an addition of ammonium salts, especially NH_4NO_3 in conjunction with tragacanth, e.g., 1 to 5% tragacanth and 1 to 10% NH_4NO_3. M.HA.

Vitrifiable flux and bonding composition containing same. J. J. KNOX (E. I. du Pont de Nemours & Co.). U. S. 2,385,580, Sept. 25, 1945 (July 1, 1944). 20 claims. Cl. 106-49.—1. A vitrifiable flux comprising between 95 and 50% bismuth trioxide and between 5 and 50% of a lead-borosilicate composition containing between 30 and 90% PbO, between 5 and 40% SiO_2, and between 4 and 25% B_2O_3.

48th Annual Meeting
American Ceramic Society

HOTEL STATLER BUFFALO, N. Y.

April 28, 29, 30, May 1, 1946

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GLASS: O. G. Burch, Owens-Illinois Glass Co., General Research Lab., Toledo 1, Ohio.

MATERIALS AND EQUIPMENT: W. E. Williams, Ceramic Supply Co., Crooksville, Ohio.

REFRACTORIES: C. L. Norton, Jr., Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.

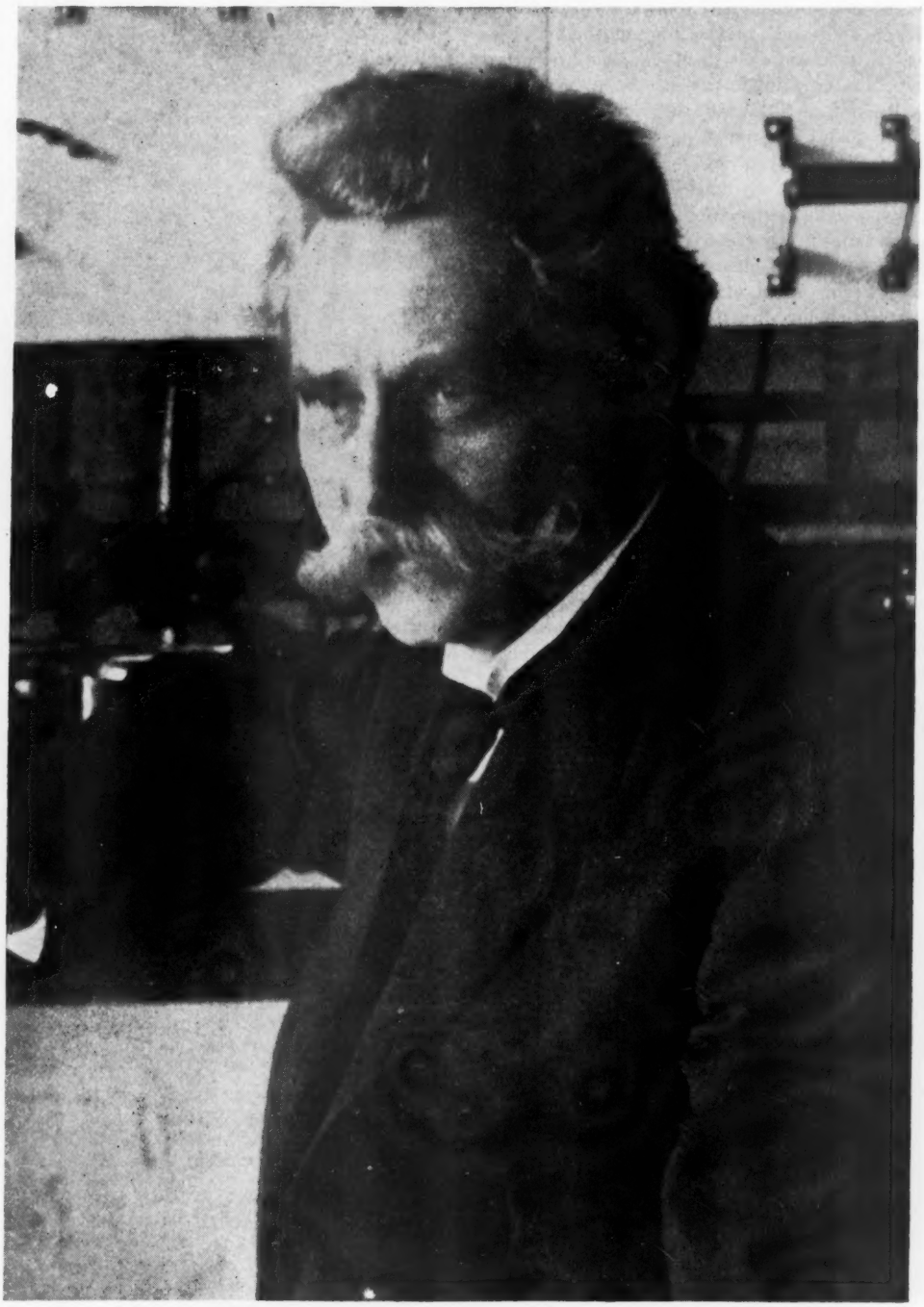
STRUCTRUAL CLAY PRODUCTS: H. L. Winburn, Niloak Pottery Co., Little Rock, Ark.

WHITE WARES: E. C. Henry, Pennsylvania State College, State College, Pa.

ALL DIVISIONS MEETING SIMULTANEOUSLY

THE BULLETIN SECTION

Volume 24 November 15, 1945 **Number 11**



SIMON H. STUPAKOFF
1854-1928

HISTORY OF THE STUPAKOFF ENTERPRISES

History of Founder

The Stupakoff Ceramic and Manufacturing Company was born almost a half century ago through the inventive and productive genius of Simon H. Stupakoff.

Mr. Stupakoff, son of German parents, was born in Hamburg, Germany, in 1854 and came to this country in 1884. As a young man he served as a deep-sea diver with the German Navy and later gained experience as a mechanical engineer with Russian and English companies. "S. H.," as he was known to his associates, possessed a combination of talents rarely found in one intellect. He was an engineer of experience with an understanding of all that was known of mechanical movements and devices. A born mathematician, he also had a thorough working knowledge of electricity and chemistry. His visual sense was remarkably keen. Most of his designs were transferred into material being directly from his finished, dimensioned, perspective sketches.

Simon Stupakoff was an accomplished linguist—he spoke and wrote fluently English, German, French, and Russian. This ability enabled him to keep abreast of the latest scientific developments, not only in this country, but in foreign lands as well. He had a thoroughly scientific mind, kept ever up to date by a wide acquaintanceship among men who did things. He was an associate of Hudson Maxim, Edison, Westinghouse, Brashear, and other great men of the day.

An outstanding characteristic was Mr. Stupakoff's capacity for work. His working day was regularly from eight in the morning until after midnight, with scarcely a holiday between. To him, his work at the factory and at home, surrounded by his family among whom there was an unusually close and understanding attachment, was one long holiday.

His inventions and contributions to industry were many and covered a wide field: signaling devices, machinery, mechanical and measuring instruments and devices used in foundries, forge shops, machine shops, and glass and ceramic plants.

Semon H. Stupakoff

A Venture in Business

In 1897, after years of loyal service in various industries, Mr. Stupakoff sought a wider field for his many talents and started his own business. He opened The Stupakoff Laboratories of which he was proprietor. This organization later became incorporated. His initial products were pyrometers and he revolutionized this industry by producing instruments of far greater accuracy and dependability and established for his Company an enviable reputation in the precision-instrument field. He introduced constant electromotive force thermocouples, cold junction compensation devices, and high-resistance millivoltmeters.

Stupakoff Laboratories (about 1913)

Mixing Department (about 1935)

A New Ceramic Developed for U.S.A.

Ceramics are used to insulate and protect the sensitive thermocouple wires in a pyrometer and are very important in pyrometer construction. Before 1914, Germany was the sole source of supply for ceramic protection and thermocouple tubing. This source was cut off with the advent of World War I and Mr. Stupakoff, aided by the National Bureau of Standards, took immediate steps to develop ceramic tubes equal in quality to those imported. He was eminently successful and his American-made product proved far superior to the German product.

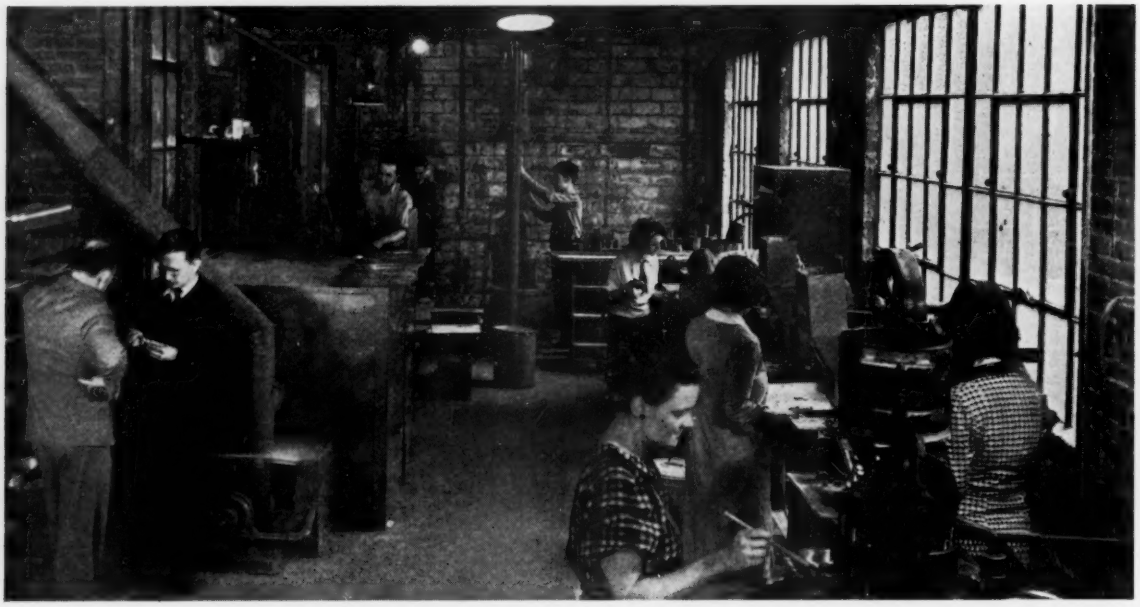
From this small beginning, Mr. Stupakoff was to see the ceramic end of his business become so important that eventually it represented practically his entire output. This is not surprising, for Simon Stupakoff had the vision to see many applications for precision ceramics, especially in the embryonic radio industry.

New and Larger Plant

In 1916, needing increased manufacturing facilities, "S. H." erected a new factory on Hamilton Avenue, Pittsburgh, Pennsylvania. He devoted much of his time to

Present Mixing Department

(1945)



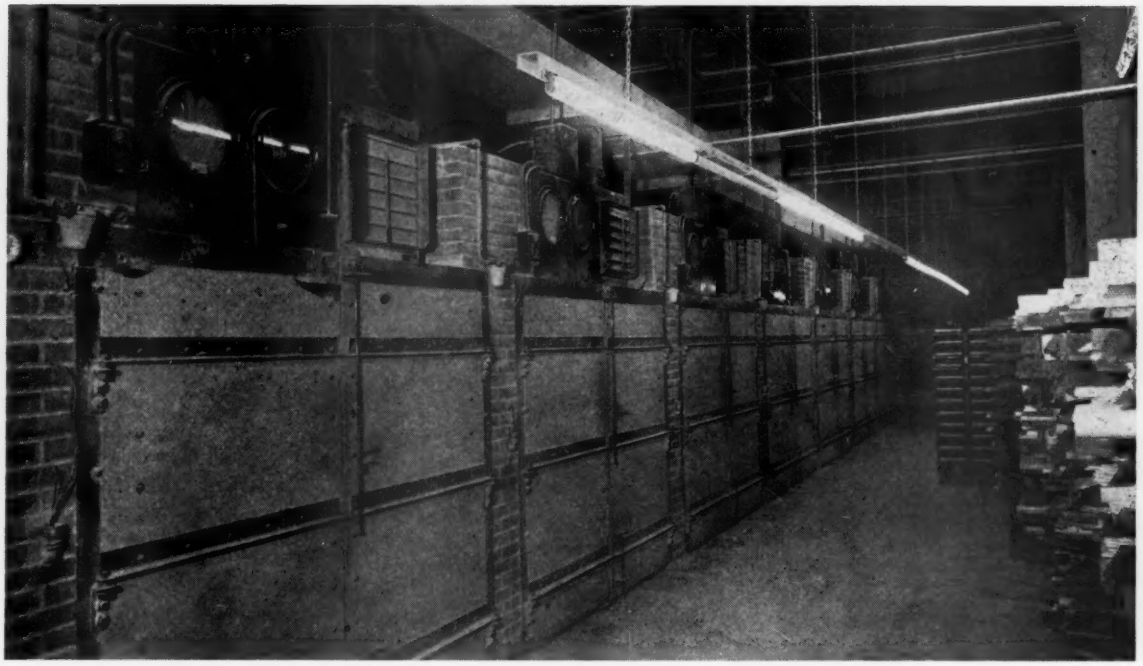
Pressing and Extrusion Departments (about 1935)

ceramic research and, in 1923, Stupakoff ceramics were used as heater insulators in the first alternating-current radio tube developed in this country. Keeping pace with the growing radio industry, Mr. Stupakoff lived to see his plant producing more than one million ceramics daily.

Death Comes to Founder

On February 18, 1928, after seventy-three years of driving activity, the clever hands and fertile brain of Simon Stupakoff were stilled forever. All who knew him remember with respectful admiration his friendly and intensive characteristics. His example of diligence, patience, and unending quest for scientific knowledge was exemplary to his fellow workers. After his death, the helm of the organization was taken over by Mr. Stupakoff's only son, Semon H. Stupakoff. He has continued the elder Mr. Stupakoff's penchant for scientific research which has resulted in increased uses for precision ceramic products.

Present Automatic Press Department



Drying Ovens

Stupakoff was first to develop pure-magnesia insulators for use in electronic tubes, and, later, to overcome the objections to chemical reaction within tubes operating at extremely high temperatures, Stupakoff introduced alumina insulators. The Company also increased the usefulness of ceramics by designing and developing machinery that would produce ceramics to very close tolerances.

New Products

In 1936, seeing the possibilities of glass-to-metal hermetic sealing, Mr. Stupakoff acquired the distribution and fabrication rights of an alloy, Kovar, specifically made for this purpose. Much early pioneering in introducing and applying this alloy was carried on by the organization, especially by Mr. Stupakoff.

Moves to Larger Quarters in Latrobe

In 1940, needing increased manufacturing facilities, the Stupakoff organization moved to a larger, modern plant at Latrobe, Pennsylvania. The name of the firm was changed to Stupakoff Ceramic and Manufacturing Company, a name more indicative of the Company's activity. Shortly afterward, the glass-to-metal sealing activity was expanded and is now housed in a separate plant—fully equipped to produce in volume positive glass-metal hermetic seals.

In its ceramic plant, Stupakoff has hundreds of automatic and semiautomatic machines, the majority of which have been designed by Stupakoff engineers.

Laboratory facilities and equipment for research and for maintaining the necessary checks on manufacturing processes are being constantly expanded. These activities are directed by a staff of specially trained and experienced research engineers.

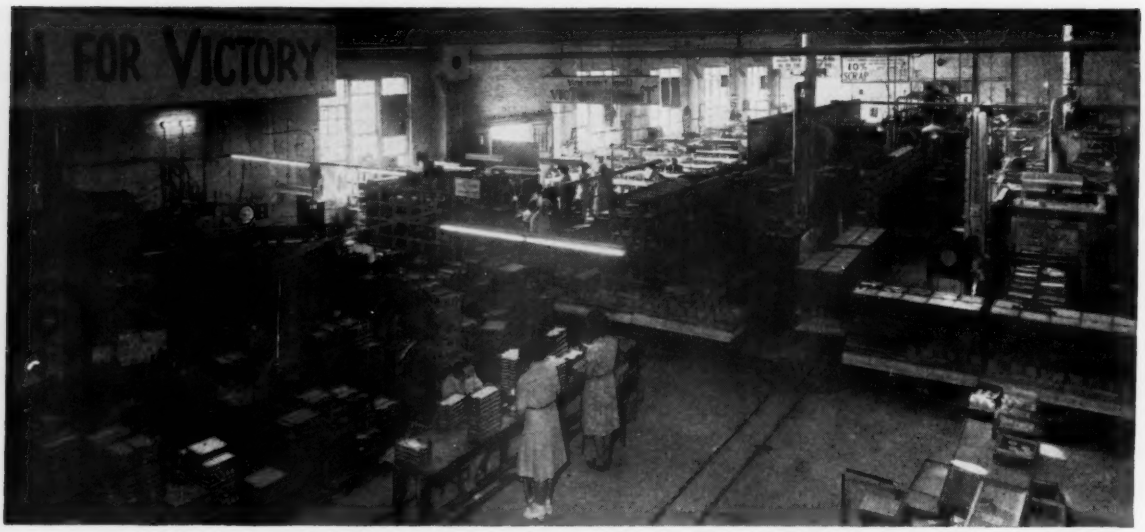
Kiln facilities are so adequate as to allow many types of firing operations to proceed simultaneously. Kilns are gas fired and temperatures are accurately controlled. In constant operation are six continuous kilns (four rotary and two straight tunnels) and many periodic kilns for high firing and experimentation. Electronic induction heating is also utilized.

Precision Manufacturing

Stupakoff radio-grade insulators are produced by several processes from a variety of materials such as steatite, alumina, magnesia, beryllia, cordierite, and zircon. The unfired or green material is extruded, pressed, either automatically (dry-pressed), wet-pressed, or cast. After the initial forming operation, the material may be machined, drilled, tapped, threaded, glazed, metal plated, or assembled with metal hardware. Commercial tolerances of $\pm 1\%$ are standard although tolerances of ± 0.001 inch can be held, and by precision grinding tolerances of ± 0.0002 inch are possible. Stupakoff has earned an enviable reputation in its ability to produce intricate and precisely made ceramics. Precision is its watchword, but precision on a mass-production scale. This precision demands tools, dies, and fixtures of an extremely precise and intricate nature. Stupakoff makes practically all the production tools needed for this work in a fully equipped tool department, manned by highly skilled tradesmen.

Entire Output for War

Because of the importance of communication equipment in World War II and because ceramic insulation suitable for high-frequency applications was necessary in the radio and radar equipment and because Stupakoff was able to produce this vitally needed ceramic insulation, it devoted its entire time and facilities to the production of such insulation and during the entire period of the war adopted



Section of the Present Kiln Department

the policy of producing nothing but war materials and continued this policy until V-J Day. During this time, it produced thousands of designs and millions of precision-made steatite, alumina, and other ceramic parts for radio and radar and other vital equipment.

Five Army-Navy "E" Awards

During the period of the war, the plant personnel expanded from around 200 to more than 1500 and for "excellence in the production of material used in vital military apparatus" the Company received five Army-Navy "E" Awards.

Peacetime Production Resumed

Now that peace has returned, Stupakoff Company is going after peacetime business as vigorously as it produced wartime materials. Electrical insulators are again made in large quantities of many types of ceramic bodies each engineered to the particular application for which it is intended. The efforts, abilities, and skill of the entire personnel of the Company are recognized as a contributing factor toward its ability to produce the quantities of quality products which it manufactures. It takes a large organization of engineers, technicians, skilled mechanics, and workers to produce a large variety of precision-made specialty products. Stupakoff is such an organization coordinating to do this difficult job.

Many men of wisdom, through untiring effort, have established enterprises which have lived long after them and which have benefited many. Such a man was Simon H. Stupakoff, scientist, engineer, inventor, and pioneer of ceramic products for the world of electronics. To him Stupakoff Ceramic and Manufacturing Company is a fitting and lasting memorial.

AMERICAN STOVE CONTEST

A contest for the design of the Gas Range of Tomorrow, involving sixteen cash awards totaling $18,000, is being conducted by the American Stove Company. It is sponsored by The Architectural Forum, with George Nelson, of the American Institute of Architects, as professional adviser.

The contest imposes few limitations on the designs. It must, however, be a stove of style and beauty that will fit into the general scheme of the home of tomorrow.

In addition to the over-all design and appearance, there is the problem of new features to be incorporated in the range, which make the job of cooking more convenient and enjoyable. Designers should also bear in mind that their models must be practical for volume production.

Designs may show a radical departure from existing practice, or they may involve only slight modifications. If desired, a series of designs may be submitted, ranging from slight modification of current models to a type completely different in construction, appearance, and arrangement.

The contest is open to all residents of the United States, with the exception of the American Stove Company, its subsidiaries, its advertising agencies, The Architectural Forum, and the families of such employees, or employees of other range manufacturers.

The cash awards are as follows: first prize $5000, second prize $3000, third prize $2000, three prizes of $1000 each, and ten prizes of $500 each. The contest opened in November and closes March 1, 1946.

Awards will be made by a jury composed of architects, designers, and home economics experts. Contestants may submit drawings in black and white, or in color. There are no limitations on either the scale or types of drawings submitted, although they must be submitted on 18- by 24-inch sheets.

A competition booklet, which also incorporates the basic technical data required in initiating a design, may be obtained free of charge by writing to George Nelson, A.I.A., c/o The Architectural Forum, Department P-3, Empire State Bldg., 350 Fifth Ave., New York 1, N. Y., mentioning the design contest.

DRYING CLAYWARE WITH INFRARED RADIATION*

By Leonard H. Hepner

Abstract

The use of this method has resulted in a great reduction in drying time, increased production from a given floor area, decreased handling, and decreased warping. The type and cost of equipment are described and compared with other types of drying equipment. Some of the drying problems and observed limitations are discussed.

I. Introduction

The drying of the larger types of sanitary ware has been, in the past, a lengthy process subject to nonuniform conditions due to variations of temperature and circulation. The use of infrared radiation was investigated with the thought of equalizing the drying of large pieces by directing radiation to the slowly drying area. The results obtained were so encouraging that the method was developed to complete the drying of the ware.

II. Ware Produced by This Method

Infrared radiation is now being used in the production of bathtubs and laundry trays. The size of the bathtubs varies from 4 feet 6 inches to 6 feet in length, approximately 2 feet 6 inches in width, and from 6 to 18 inches in depth. The laundry trays consist of two compartments having an over-all length of 36 to 42 inches, a width of 25 inches, and a depth of 14 inches. All ware is produced with a 1-inch wall thickness. The body consists of a blend of plastic siliceous refractory clays and a suitable proportion of prefired grog. The ware is formed by the conventional solid casting process.

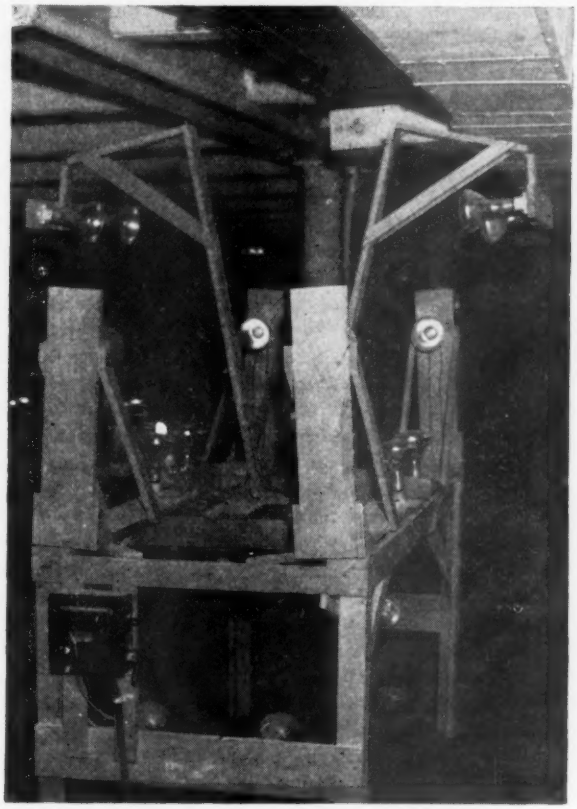


Fig. 1.—Light portable unit used to dry bathtubs. The sides and ends are turned up to minimize storage space required in the casting shop during the casting operation.

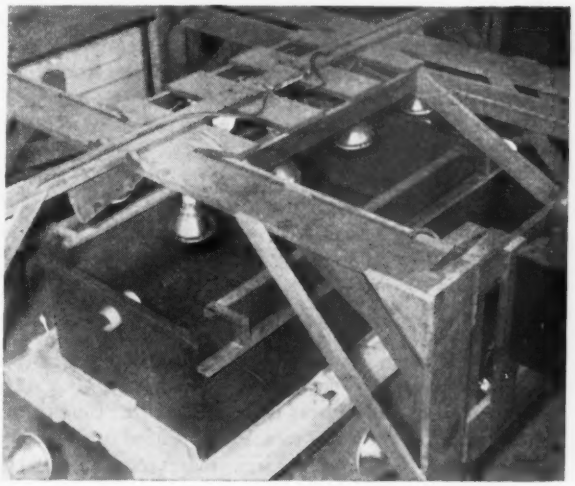


Fig. 2.—Position of portable unit during the drying operation.

III. Equipment

The equipment consists of 250-watt 110-volt R-40 drying lamps placed on metal or wooden frames in such a position as to insure radiation to all surfaces of the ware. It is necessary to radiate energy to only one side of each wall. Thus the sides and ends of tubs are dried by radiation to the outside surface and the bottoms of tubs by radiation to the inside surface. The frames supporting the drying lamps were constructed as light as possible to permit removal of the frame from the casting area after drying of the ware (Fig. 1). This permits free access for handling molds and finishing of the ware from successive casts.

The reflector-type (R-40) drying lamps were used because of the low cost as compared with the clear lamp mounted in a suitable reflector and the ease of maintaining a clean, efficient reflecting surface.

The power was derived from a 220-volt three-phase circuit. Groups of two 110-volt lamps were wired in series. Care was taken to balance the load on each phase.

The unit (Fig. 2) constructed to dry the 4-foot 6-inch

* Forty-Seventh Annual Program, The American Ceramic Society, 1945 (Materials and Equipment Division, No. 1). Received August 11, 1945.

tub contained 20 lamps representing a load of 5 kw. and a consumption of 60 kw-hr. to completely dry the piece. The laundry-tray unit contained 12 lamps representing a load of 3 kw. and a consumption of 36 kw.-hr. to complete the drying (Fig. 3).

IV. Cost of Equipment

The cost of installation of the infrared drying system for this purpose, including the necessary increase in transformer capacity and the power-distribution lines throughout the casting shops, was less than the estimated cost of any other type of drier with sufficient capacity to handle an equal volume of ware.

Other methods of drying would necessitate transportation to and from the drying unit.

The requirements of floor space for the drier would be several times as great.

The drying cycle would be greater than the time required to dry with the infrared radiation. The shortest cycle obtained to date with a steam-heated, humidity-controlled unit was 36 hours. In this unit, it was impossible to load the large ware.

V. Drying Cycle

Before the adoption of the infrared drying system, the ware was allowed to dry in the casting shop for 2 days. Sufficient dry strength was developed at this time to permit removal of the ware to a steam-heated drying room. Drying-room temperature was maintained at 100°F. Ware dried in 10 to 12 days.

The complete drying of the ware is now accomplished in 12 hours with the use of the infrared radiation. The ware is ready for the glaze application on the day following its removal from the mold. This operation alone resulted in a reduction of two weeks' time in the production cycle of the tubs. Other improvements in processing have resulted in decreasing the production cycle from 7 weeks to 1 week. The tubs are now crated and shipped 7 days after date of casting.

VI. Advantages in Using Infrared Radiation

The chief advantage is the decrease in the drying cycle. Other advantages are as follows:

(1) Elimination of hazard and the labor cost involved in handling and transporting ware, while in a semidry state, to and from the drying room.

(2) Elimination of the need of a drying room. This saving includes the cost of heating the room as well as the saving of floor space equal to three times the area required for casting.

(3) Increase in production from a given casting area. The unit production from a given casting area was doubled by the elimination of air-drying in the casting shop before removal to the drying room.

(4) Decrease in warping of the ware obtained by the rapid drying. Ware was hardened at a rate fast enough to prevent the previously experienced plastic deformation caused by the weight of unsupported sections of the ware.

VII. Experimental Development of Drying Method

The possibility of drying the clay body used in this type of ware was demonstrated by drying a 6-inch disk with a 1-inch wall thickness. This disk was dried successfully by suspending one of the 250-watt R-40 lamps 8 inches above the disk. A thermometer was embedded in the center of the clay to indicate the penetrating effect of heat and to observe the temperatures obtained. The disk was dried on a laboratory scale. Readings of temperature and weight were taken periodically. The drying was started on the disk as soon as it was removed from the mold.

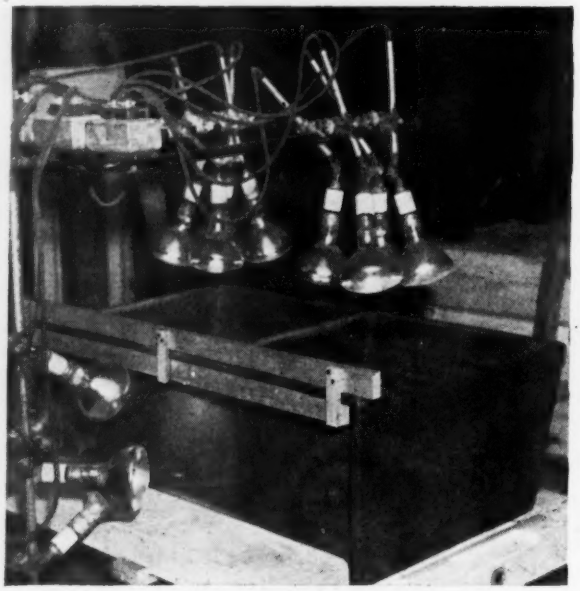


FIG. 3.—Portable unit used for drying laundry tubs. The tubular frame attached to the counterbalanced foot is mounted on casters. Sockets with three directional adjustments simplify the adaptation of the unit for drying ware of various sizes and shapes.

The temperature of the clay (at the center of the disk) began to rise a few seconds after the power was turned on. This temperature increased rapidly until the rate of moisture elimination became great. At this point, the temperature remained fairly constant until the moisture content dropped to 9%. The temperature increased during the rest of the drying period. The maximum temperature reached was 176°F. The total time required to dry this disk was 7 hours. No effort was made to circulate air around the disk. The drying was obviously retarded by condensation of moisture on the scale pan. No defects were observed in the dry disk.

The next step consisted in drying a rectangular test box 40 by 10 by 5 inches with a 1-inch wall thickness. Drying lamps were supported around the sides and ends and over the top of the test box. The radiation indicated by the visible light pattern from the lamps was not absolutely uniform on all surfaces. The test box, however, was dried without defects in 16 hours. The number of lamps was increased and the drying was completed in 12 hours. Visible loss of moisture usually occurs from 5 to 10 minutes after the start of the drying and continues until the rate of evaporation materially decreases.

The completion of the development of the infrared drying method was carried out on ware in actual production. Frames were constructed of proper dimensions to support the lamps around the bathtubs. Sockets with three di-

rectional adjustments were used to obtain the desired flexibility in adjusting or focusing the lamps. The maximum concentration of radiation from the shape of the reflectors used occurred at a distance of 8 inches from the surface of the lamp. It was not found necessary to use the maximum concentration of radiation to dry the ware in the 12-hour period convenient to other production factors. Consequently, the distance of lamps from the ware and number of lamps were decreased to obtain safe distribution in sufficient volume to dry the ware in 12 hours. This was obtained at a distance of 18 inches from the lamp surface to the ware.

Large surface areas were more uniformly dried by slightly increasing the distance of lamps from the surface and increasing the number of lamps radiating energy to that surface. The permissible variation in uniformity of radiation has proved to be greater than was originally indicated by laboratory tests. It has been impossible to dry ware with the 1-inch wall thickness in which there are concealed brackets or sections unless it is possible to direct radiation from some direction to these sections.

After the proper location of the lamps was determined, frames with fixed socket positions were constructed for use in production. The surface of lamps must be cleaned periodically to insure operation at maximum efficiency.

VIII. Conclusions

(1) Infrared radiation can be used as a rapid and safe means of drying clayware.

(2) Rate of drying is a function of the concentration of the radiation, which in turn depends on the distance of the lamps from the ware and the number of lamps used.

(3) The need for uniform radiation to all surfaces increased with the intensity of radiation.

(4) A drying system was developed for the previously described type of ware which resulted in (*a*) a reduction in the drying time from 14 days to 12 hours, (*b*) elimination of drying-room handling and operation, and (*c*) increase in the production of a given casting-shop area.

(5) The cost of installation was less than the conventional temperature- and humidity-controlled units.

THE TRENTON POTTERIES COMPANY
PLANT NO. 5
TRENTON, NEW JERSEY

INCREASING THE LIFE OF BRICK AND TILE DIES*

BY PHILIP W. TEFFT

ABSTRACT

The design of all-steel welded dies is discussed. By the utilization of hard-metal liners and a method for resurfacing them, liners can be used for months without renewal.

I. Introduction

One of the important problems in the manufacture of stiff-mud structural clay products is the designing, building, and maintenance of extrusion dies. Not only is the initial cost of dies a vital cost factor, but through proper die design loss of ware in the process of manufacture can be reduced materially, resulting in lowered production costs. Properly designed lightweight units produced with dies that are properly maintained reduce (1) the tonnage of raw material required per thousand units produced, (2) the fuel required for drying and firing, (3) shipping costs, and (4) the work load involved in handling the ware in the various stages of manufacture. The proper design of dies also greatly affects the quality of ware produced.

The importance of this problem cannot be over-emphasized. In the production of a wide variety of structural clay units, including a full line of ceramic glazed and coated brick and tile, buff and gray unglazed facing tile, red and buff face brick, hollow tile, buff and red chimney radials, 8- and 9-inch series acid brick, and insulating fire brick, the die problem is costly. For example, the total cost of dies over a 3-year period in three plants producing the foregoing ware was $18,000. This cost figure prompted the Company with which the writer is associated to make a thorough study of die design.

II. Discussion of Past Practice

Originally all dies used by this Company were of the cast-iron steam-lubricating ring type with variations in the number of rings, taper, etc. Faceplates were fitted with steel liners which could be renewed when worn.

Patterns for all of these dies were made in the Company shop. Castings were made by a local foundry. Machining and final assembly were done in the Company shop. The approximate average initial cost of this type of die was $150.

These dies were objectionable for a number of reasons: (1) Initial cost was high. (2) Maintenance cost was too great; an entire set of rings and backplate had to be changed at fairly short intervals. (3) This type of die was not flexible enough; slight changes could not be made without a complete new set of rings, a new faceplate, and backplate; this involved new patterns, castings, and machine work; thus slight die changes were expensive. (4) It was difficult to keep dies in balance owing to rapid wear; as rings wore, lubrication became poorer. (5) It was difficult to keep uniform unit weights.

III. Discussion of Procedure

With these objections in mind, it was decided to proceed with a program involving three objectives: (1) to design a die which could be produced for a minimum cost, (2) to produce a die with longer life and lower maintenance costs, and (3) to produce a die through careful study which would make better-quality ware.

These three objectives were pursued in succession, with

* Forty-Seventh Annual Program, The American Ceramic Society, 1945 (Structural Clay Products Division, No. 3). Received June 2, 1945.
Presented at Central Ohio Local Section meeting, Granville, Ohio, May 23, 1945.

the development first of a low-cost welded-steel die. Prolonged study resulted in simplification and still lower cost of this die.

A study of hard-alloy liners and cores along with a study of clay flow through the dies resulted in the development of a die as shown in Fig. 1.

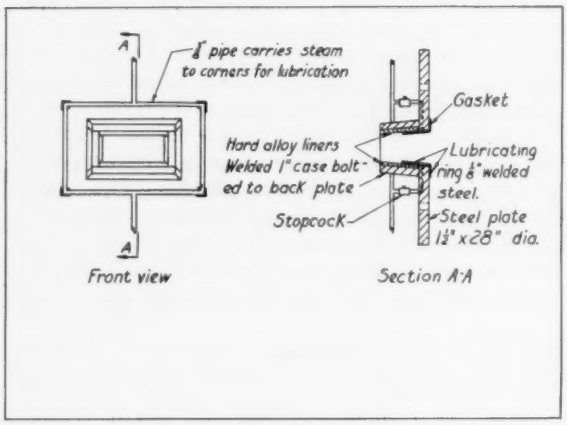


FIG. 1.—Welded-steel die.

IV. Discussion of Results

Details such as length of die, length of ring, and taper are not indicated, as they vary with the unit being made and vary from plant to plant. The bridge, stems, and cores, moreover, are not shown. These vary considerably, depending on the unit being produced. Through the variation of these details, it is possible to balance the flow of clay through the dies. Such problems require study and must be worked out for each product in each plant.

The die shown in Fig. 1 is built entirely of welded steel. No patterns or castings are involved, except for the hard-alloy liners and cores. The cost of this die, including bridge, stems, and cores, is approximately $100 for labor and materials.

The hard-alloy liners are ½ inch thick; when maximum allowable wear has taken place they are resurfaced by surface grinding in the Company shop. This involves little time and no material. Experience has shown that the liners must be resurfaced when they have produced three and one half million brick. The resurfacing can be repeated a sufficient number of times so that a total of approximately twenty-five million brick can be produced on a single set of liners. Surprisingly enough, one lubricating ring, if coated with a hard metal at the back edge, will produce fifteen million brick. The hard-metal cores will produce five million brick. The core bridge, made of soft steel, will produce approximately the same number of brick and wear out two sets of soft-steel stems. Maintenance costs on this die are at a minimum. Die wear is controlled by green weights of units produced. Minimum and maximum green weights are set up for each unit, with allowance for some wear. Maximum green weights will produce standard fired weights.

This die will produce better-quality more uniform ware. Balance does not change rapidly with wear, as wear is very slow. Neither is lubrication affected by wear. In fact, the hard-metal liners become so smooth that the die can be run satisfactorily without lubrication.

This type of die lends itself nicely to the production of small-volume items. By putting a much larger opening in the backplate and fastening the die case to a ¾-inch backplate, which in turn can be bolted to the inside of the 1½-inch backplate, the same backplate and lubricating pipe can be used for a number of different dies. The lubrication is simply carried through to slots in the back of the 1½-inch backplate. Lubrication is then provided for in the ¾-inch plate in exactly the same manner as for the 1½-inch backplate (Fig. 1).

Individual dies used in the same backplate cost approximately $30. As large quantities of production are not involved, the dies are not lined with hard-metal liners. They are lined, however, with soft steel so that the die size can be controlled.

In some cases, it has been possible to provide a single die with several different sets of liners and lubricating rings which can be changed to make several different-sized units; e.g., several different circle brick of approximately the same size may be made on the same die in this manner. This is truly a low-cost die with great flexibility which will produce quality ware.

THE CLAYCRAFT COMPANY
BOX 866
COLUMBUS 16, OHIO

POSTWAR BUILDING BRICK DEMANDS

The demand for brick and tile is expected to reach the record-breaking total of 18 billion brick equivalents a year within two years after the end of the war, according to J. Ernest Fender, president of the Structural Clay Products Institute, Washington, D. C.

The increased demand, which will arise from the unprecedented volume of postwar construction and from the wider use of brick and tile in certain types of building, would exceed by 17 per cent the production record of 15,388,000,000 brick equivalents set in 1925.

The postwar demand for brick and tile was estimated on the basis of past relationships between the industry's total output and the number of new dwelling units constructed. Although structural clay products are widely used in nonresidential building, analysis of figures for the 17-year period ending with 1938 shows that about 18,000 brick equivalents have been produced for each new dwelling unit erected. Thus, the average of one million new units which has been widely predicted for the postwar years indicates a demand for slightly more than 18 billion brick equivalents annually on the average.

TWA ADOPTS NEOPRENE-COATED FIBERGLAS FOR SEAT, BUNK, AND STEERING-GEAR APPLICATIONS

Following tests of tear and tensile strength, dimensional stability, and general durability in use, TWA (Transcontinental & Western Air, Inc.) has adopted a Neoprene-coated Fiberglas cloth as the supporting fabric for seats on all its commercially operated planes and for crew bunks on its C-54 passenger and cargo planes. It has also developed a steering-gear dust boot of Neoprene-coated Fiberglas cloth for all its planes.

PORCELAIN ENAMEL, THE VERSATILE FINISH*

By F. L. Meacham

Abstract

The history and development of porcelain enamel up to its present-day status are discussed briefly. The uses for porcelain enamel are described as well as the many properties that make it a versatile finish.

Porcelain enamel has been used for various purposes for many years. In its inception it was used principally, however, for decorative purposes. The wide range of bright colors in which it could and can be produced, together with its brilliance and permanence, made it desirable for such uses. As time passed and more became known about the properties of porcelain enamel, the demand for its use as a finish for articles having utility as well as beauty increased. Consequently, porcelain enamel found wide acceptance as a finish on articles such as stoves and ranges, refrigerators, washing machines, signs, buildings, and sanitary and cooking ware. There are many other applications for porcelain enamel, but these are the most important.

Porcelain enamel was found to be an ideal finish on stoves and ranges, where temperature conditions are encountered under which most other types of finishes, particularly those of an organic nature, are entirely lacking in adequate heat resistance and color stability.

Porcelain enamel has proved, through years of experience, to be the ideal finish for a refrigerator, either ice or mechanical. Only an elementary understanding of the principles of refrigerator construction is required to realize that the exterior surface of a refrigerator is necessarily slightly below the temperature of the surrounding air. This means that for a large part of the year, refrigerators, under most service conditions, tend to sweat or at least condense an incipient film of moisture on this surface. This produces a corrosion condition which is quite severe—much more so than that encountered in applications such as the automobile, ordinary buildings, or other appliances which operate at or above room temperature. No finish offers the permanence of porcelain enamel as an exterior finish for refrigerators.

The smooth, impervious surface of porcelain enamel enables the user to clean easily the food compartment. Consequently, porcelain enamel is the preferred finish for refrigerator interiors.

Porcelain enamel is unaffected by soap and other chemicals ordinarily used in a laundry. Neither is it affected by the rapid temperature changes sometimes encountered when boiling water pours into a washing machine on a frosty winter morning. It is easy, therefore, to understand why the washing-machine tub came to be finished in porcelain enamel. The economies of the problem were also a major factor; by using this finish the tub could be made from sheet steel, which costs much less than the previously used tinned copper or cast aluminum. Thus, the adoption

F. L. Meacham

of the drawn-steel, porcelain enameled washing-machine tub resulted in lower costs, better and more pleasing design, and longer life. Lower costs mean lower prices to users, and lower prices to users mean an ever broader market.

For many years, sanitary ware, such as bathtubs, lavatories, and kitchen sinks, has been produced from cast iron and finished in porcelain enamel. More recently, these articles have been made from pressed steel and enameled by the wet-process method. Porcelain enamel has proved to be an ideal finish for these articles, as they can be finished in white or any number of harmonizing colors. They add brightness to a room and do not tend to deaden the room or kill the light, as happens when dark metallic finishes are used. In this application, moreover, ease of cleaning is most desirable.

Whether in the long run the cast-iron or pressed-steel shapes will predominate depends entirely upon the economic situation and the job of marketing which the various producers pursue. But, whether made from cast iron or pressed steel, these articles undoubtedly will continue to be finished in porcelain enamel for years to come.

* Forty-Seventh Annual Program, The American Ceramic Society, 1945 (General Session, No. 3). Received April 26, 1945.

Presented at Chicago Local Section meeting, Chicago, Ill., April 7, 1945.

Porcelain Enamel Has Many Desirable Properties

The properties of porcelain enamel which make it such a desirable finish are as follows:

(1) Porcelain enamel is undoubtedly the best corrosion-resisting finish that has ever been applied to ferrous metals. Its permanence of color and life-long endurance is well recognized. There are innumerable examples of porcelain enamel which have endured outside weathering exposure for more than twenty-five years.

(2) Porcelain enamel can be produced in pure whites or in a wide range of colors which will harmonize with any color scheme of the bathroom or other surroundings.

(3) Its heat resistance is unequaled by any other finish.

(4) It has excellent scratch resistance, i.e., it stands repeated cleaning and outdoor exposure without damage to its surface.

(5) It is unaffected by grease and is entirely resistant to all organic solvents.

(6) It can be made in various degrees of acid resistance or completely acidproof even in contact with boiling and concentrated acids.

(7) It is the easiest-known finish to clean. Its nonporous surface is one of the main contributing factors to ease of cleaning.

This wide range of desirable properties combined in one finish makes porcelain enamel truly the versatile finish and the standard with which other finishes are compared.

Owing to its abrasion resistance, porcelain enamel has replaced other materials in electrical control equipment for electric locomotives. One part of this equipment consists of bar copper approximately $^1/_4$ inch thick and 3 inches wide, wound edgewise into a package about 3 feet long and 1 foot wide. Since it is used on control equipment, it tends to heat and must consequently be air-cooled. It must be coated, moreover, with electrical insulation which does not seriously hinder the necessary heat dissipation.

The early electrical insulating materials used for coatings were unsatisfactory, as the dirt in the cooling air, which was picked up from under the locomotive, quickly abraded the coating from the surface of the copper bar. After experimentation, it was found that if the copper bar was porcelain enameled after forming, the heat could be satisfactorily dissipated and the finish would successfully withstand the abrasive action of the dirt carried in the cooling air. Consequently, repair and replacement for that cause of failure became unnecessary.

The inert characteristic which can be built into porcelain enamel is shown by the fact that it is a preferred finish on food handling and processing equipment. In the chemical industry, acid manufacturing and handling equipment are lined with acidproof porcelain enamel. Digesters and processing containers which operate at high and low pressures and temperatures are also coated with acid-resisting enamel. It is used particularly when minute contamination of the material being processed cannot be tolerated.

The excellent corrosion-resisting properties of porcelain enamel make it the preferred coating for hot-water heating and storage tanks.

The resistance of porcelain enamel to corrosive atmospheres is also shown in the recently developed porcelain enameled smoke pipe or flue lining, which is used in place of solid ceramic liners in chimney installations. When the metal liner is coated with acid-resisting porcelain enamel, the resulting product is easy to assemble, light in weight, and possesses long life. Such a flue offers quicker and better draft and has proved to be safe from the fire standpoint.

The Underwriters Laboratories have reported on this product in their report headed "Miscellaneous Hazard 2962, June 16, 1943, Report on Vitro Liner Flue Type E." In their conclusions, they state that, although the specifications for the previous flues were not fully met by the Vitro Liner, the intent of the specification was well covered. This type of flue will undoubtedly be used extensively in the postwar era.

Essential Requirements for a Quality Porcelain Enamel Finish

As with other finishes, careless manufacture can produce a poorly finished piece of merchandise. Some of the essentials of a good porcelain enamel finish therefore might be as follows:

(1) The coating should be continuous on all essential surfaces so that local corrosion cannot start. (If local corrosion should start at a point where the porcelain enamel coating has been damaged, it will not migrate from the point of damage on the surface of the metal and beneath the enamel, as in organic finishes.)

(2) The coating should have adequate coverage for good appearance and consumer acceptance. In whites, this is called reflectance. Reflectances of 70 to 72%, as measured by the Hunter reflectometer, are adequate.

(3) The coating should be as thin as possible, for the thinner the coating the less susceptible it is to damage. This, therefore, calls for enamels with adequate covering power so that it is unnecessary to employ thick coatings to attain satisfactory appearance. In the early days of porcelain enamel finishes, owing to the lack of opacity in cover coats, thicknesses ranged from 0.018 to 0.025 inch to secure a reflectance of 70 to 72%. Today, through the use of modern enamels with higher opacity, these coatings for the same reflectance have been reduced to the order of 0.012 to 0.014 inch. This reflectance sometimes is gained with even thinner coatings.

(4) If the product is to be exposed to acidic conditions, the porcelain enamel coating should be acid resisting.

(5) In certain applications, adequate thermal-shock resistance is required. This is a specific requirement of cooking ware.

(6) Regardless of the application, enamels should be bonded properly to the base metal.

All of the foregoing properties can be adequately designed into an enamel coating. If attention is given to a determination of the requirements of the finish, the proper enamels can be specified to produce the desired result.

Improved Formulation Has Resulted in Greatly Improved Properties of Porcelain Enamels

During recent years, porcelain enamel has developed greatly in many respects. Enamels have been devised, enameling metal has been developed, and processing has been improved to the point where the bond of the enamel to the base metal is far better than in the early days of this metal-finishing process.

Cover coats have been developed which are more

opaque and which permit the finishing of ware to a specified reflectance with much thinner coats.

Acid-resisting cover coats have been developed which can be applied at nominal cover-coat firing temperatures without processing difficulties. When first used, acid-resisting cover coats required high firing temperatures, were difficult to use, and were low in opacity. Today these faults have been largely overcome.

Acid-resisting ground coats have been developed which permit single applications of acid-resisting enamel properly bonded to base metal.

In general, firing temperatures have been reduced.

Through the development of lower-firing ground coats and cover coats with a wider firing range, it is now possible to fire both ground and cover coats simultaneously on the same predetermined firing cycle. This has greatly simplified production conditions in many plants where single continuous-furnace installations exist; i.e., it is not necessary to operate the furnace entirely on ground coat and bank the fired ware for later processing in cover coats. This results in a uniform flow of finished production and eliminates much handling and consequent processing damage.

All of these improvements in porcelain enamel coatings have resulted in enameled ware much superior in quality and far less susceptible to damage than that produced several years ago.

One of the most recent developments, which has been the dream of enamelers since the first piece of sheet steel was enameled, is the application of finish coats directly to the base metal. Although this is not a large-production reality today, sufficient information and experience have been gained to indicate that it is a possibility of the near future. This problem, however, is still in the development stage. Its success depends equally upon the enameling sheet, the enamel itself, and the processing which the two receive.

The steel manufacturers have made excellent progress in producing sheet metal which will accept an enamel coating with a minimum of disturbance from the base metal. Porcelain enamels, moreover, have been developed which make possible the production of finished ware with a satisfactory appearance and a total thickness not exceeding 0.007 inch.

Simultaneously, many processing details are being learned which manufacturers must take into account if enamel coating is to be a success, viz., better cleaning of the parts to be finished, better plant handling, and closer process control. These precautions are also beneficial in conventional enameling. If the problems of this new enamel coating are tackled with an open mind and a determination to do all things right, in the near future the industry may produce large quantities of ware with single-coat applications.

The future success of porcelain enamel, as well as any other finish, will depend largely upon the intelligent use of trained technical personnel. It is unfortunate that trained technical help is today difficult to obtain and will remain so for the next several years. Our armed forces are now using our college candidates. It will be many years before this deficit in trained technical help can be wiped out. Technologists must establish controls and then train persons with lesser qualifications in the routine task of seeing that these controls are followed. This will free technical personnel for the more responsible problems dealing with over-all production. Exercising controls costs money but pays large dividends.

No organization is stronger than its personnel, so these problems warrant continued and earnest attention. Only qualified individuals should be placed in charge of operations. All available technical men should be engaged and given the authority to do their job. If this is done, a quality product will result, provided a reasonably satisfactory plant is at their disposal.

The outlook for porcelain enamel is bright. Its future, however, depends entirely upon the manner in which our industry handles the problems which arise. We must of necessity continually devise improvements in the enamel coating and strive to accomplish ever lower production costs. If our industry handles these problems intelligently, we are certain to find new applications for porcelain enamel.

CHICAGO VITREOUS ENAMEL PRODUCT COMPANY
1401–47 SOUTH 55TH COURT
CICERO 50, ILLINOIS

WHITE, GRAY, AND BLACK REFLECTANCE STANDARDS

The National Bureau of Standards, Washington 25, D. C., is now prepared to issue sets of white, gray, and black reflectance standards. Each set contains ten calibrated porcelain enameled panels which diffusely reflect approximately 80, 70, 60, 40, 20, 15, 8, 4, 0.8, and 0.5%, respectively, of the light that strikes them. They are 4 by 4 inches in size and have folded edges to minimize warpage resulting from enameling.

These standards are intended primarily for use with reflectometers used to measure paints, papers, textiles, ceramic products, and other opaque materials for reflectance and approximate color by the photoelectric tristimulus method. As was pointed out in *Nat. Bur. Standards Circ.* **C429** (July, 1942) on photoelectric tristimulus colorimetry, accurate chromaticity measurements are possible only when samples and standard are spectrally similar. For this reason, accurate measurements of the colors of only near-white, near-gray, and near-black materials are possible with the new standards. They are intended primarily for use with the multipurpose reflectometer developed at the National Bureau of Standards (*Jour. Research Nat. Bur. Standards*, **25** [5] 581–618 (Nov., 1940); R. P. 1345) and with other reflectometers used to measure 45° 0° directional reflectance.

Each set is calibrated with the blue, amber, and green filters described in *Nat. Bur. Standards Circ.* **C429** and is packed in a permanent, hinged-top, wooden box. The fee to non-Government agencies is $50 a set.

GLAZED COATING INCREASES REFRACTORY LIFE

A new bulletin issued by the Brickseal Refractory Co., 1029 Clinton St., Hoboken, N. J., describes Brickseal Refractory Coating which is applied to refractory brickwork or plastic refractories by paint brush or spray gun. Composed of high-fusion clays and metal oxides combined in oils, Brickseal fuses under heat to form a highly glazed, monolithic protective coating over the entire refractory structure.

★ LETTERS FROM SERVICEMEN ★

Pensacola, Fla.,
3 September, 1945

Dear Dr. Purdy:

Your news letters to servicemen and their replies have been very interesting to me. During my three years in the Navy, I have maintained my interest in ceramics. It will probably be interesting to you and surprising to young students to know that, although I am a naval aviator and commercial pilot, ceramics still holds a greater interest for me than this very modern and thrilling subject!

Yours sincerely,
F. L. BURNS,
Lieutenant (jg), U. S. Naval Reserve

★

Manila, Philippine Islands,
20 September, 1945

Dear Dr. Purdy:

Your letter of 6 June reached me here yesterday after being mis-sent a couple of times. The fault is our own postal service, as the letter was addressed correctly.

I was very glad to get the information it contained and was particularly pleased with the way The Society is endeavoring to aid the serviceman. This is a very noble gesture and I am sure we all appreciate it.

It has been hoped for some time that I would have an opportunity to visit Japan for the purpose of industrial survey. This would give me a chance to gather information on their ceramic industry, which I would have liked very much. The present feeling on the top side at the moment seems to be that such a survey is not necessary. No decisions as yet, but it appears quite likely I will be coming home soon, having missed this opportunity.

The city of Manila really received a beating in this war. Hardly a building is left untouched. Old salvaged tin is being used to set up shops, where all types of articles and curios are sold at outlandish prices. The Filipinos do not appear downhearted, so I am sure Manila will again be a beautiful city. This, however, will require several years.

Since it is very likely I will return home soon, I would suggest all correspondence from now on go to my home address.

Thank you for all past favors.

Sincerely,
ORVILLE O. KENWORTHY,
Major, CWS

★

San Francisco, Calif.,
11 September, 1945

Dear Dr. Purdy:

I wish to thank you and The Society for the interesting monthly letters which have been sent to us servicemen. Many of us in the Navy and Army are having a difficult time keeping posted on ceramics and The Society's doings, due to our erratic travels and other handicapping conditions. I am vitally interested in ceramics and your letters are especially appreciated because they have kept me abreast of ceramic progress. Your letter of June 6, 1945, was especially timely as it thoroughly answered many questions that have been on my mind these last three years.

At this moment I am in Nagasaki, Japan, with sufficient points to be discharged, and transportation to the United States is expected presently. Upon my arrival at Seattle I will be returned to inactive duty and in December, this year, my commission in the Naval Reserve will have expired.

My entry into the service came immediately after my graduation from college. Considering the great amount of spare time I have had in the last year and which I have employed in the study of ceramics, I do not intend to return to school for a refresher course. I am anxious to get started in ceramics and your comments on those parts of the industry which are growing and what fields are in need of men would be greatly appreciated.

Following your suggestion, a short biography is given below, for your reference, in case requests are received for men.

I am twenty-nine years of age, married, and have one child. After graduation from high school in June, 1935, I entered the University of Washington, at Seattle, and graduated in June, 1942, with a degree of Bachelor of Science in Ceramic Engineering. In school I was affiliated with Alpha Sigma Phi fraternity and was its president in 1939. Since my entrance into college I have been completely self-supporting. My attendance at school, therefore, except for the last year, was limited to two school quarters a year. The remaining six months of each year I was employed as a merchant seaman. During the last year of school, I was employed at the Boeing Aircraft Company, on the night shift, as an inspector of raw and finished materials.

In June, 1942, I was called to active duty in the Navy as an ensign, and upon completion of eight months of schooling in Diesel and electrical engineering, was assigned to a newly constructed destroyer escort as chief engineer. This tour of duty lasted a year and a half, at the conclusion of which I was assigned to this seaplane tender in the same capacity.

During my time in the Navy, I have been very closely associated with machinery maintenance and repair, and with personnel and organizational problems of all types. My civilian working experience taught me the value of willing, cheerful cooperation with an employer, and my three years of duty as a naval officer have given me practice in the technique of handling men of all types so as to make them wish to do their best for me.

On November 1, my release from the Navy should be effected and I can be contacted at 4741 35th Ave., N.E., Seattle 5, Wash. Letters of recommendation may be obtained from all of my former employers, including the commanding officers I have had while in the Navy. All comments or suggestions that you care to make would be greatly appreciated.

Thank you again for your kind and helpful consideration.

Yours very truly,
ALLEN J. ERICKSON,
Lieutenant, U. S. Naval Reserve

★

San Francisco, Calif.,
11 September, 1945

Gentlemen:

Thank you for your letter of August 30 advising me of the procedure for renewing my membership. Enclosed please find a money order for $4.17 which will complete payment of my 1945 dues.

During my transition from the Atlantic to the Pacific, I was fortunate to have the opportunity of attending the June meeting of the Baltimore-Washington Section. The opportunity for meeting old friends and meeting some new ones was a real tonic. It was encouraging to hear firsthand of some of the progress and advances made in the ceramic industry during the war and of plans for the future.

Now stationed in Hawaii, I am hoping soon to be returning to civilian life and to the ceramic industry. I am sure we can all look forward to playing a larger and more useful part in the Nation's industry and life in the postwar world.

The servicemen's letters have been more than welcome in these days of separation from the ceramic industry, and your efforts in keeping us informed of new developments and plans for the future have been sincerely appreciated.

Yours very truly,
C. E. WASHBURN,
Lieutenant (jg), U. S. Naval Reserve

THE PRESIDENT'S PAGE

STATE CERAMIC ASSOCIATIONS

There are now five ceramic associations organized in as many states to promote the interests of the manufacturers and users of ceramic products. The states are the more important ceramic producers, Ohio, New Jersey, New York, Texas, and Illinois. An association of the same kind is being put together in Pennsylvania. There are several other states where organizations of this type would be helpful to the ceramic industry.

What is the purpose of a state ceramic association?

I am a member of the Ohio Ceramic Industries Association with the background of long connection with the affairs of this organization. I want to describe what we do as we consider our group to be an important part of the ceramic industry in the State of Ohio.

We are closely associated with The Ohio State University to promote ceramic education. We want to insure ourselves of an increasing number of trained men. We are able to help the University staff in developing the proper curricula so that graduates may fit easily into our companies and be successful. We are also able to assist in securing the necessary appropriations for this work. Our activities center at the University and a member of the teaching staff acts as our secretary.

I believe that this arrangement with the state university is true of most of the other associations. This close connection with the educational facilities of the state serves to bring to these meetings the men who are developing new ideas in ceramic manufacture.

We also work closely with the Engineering Experiment Station on ceramic projects and much of this work is supported by our members. This gives us access to facilities for research and experimentation which are not available to individual plants. It also makes possible projects of a continuing nature requiring several years of study by highly trained men. Such development work would not be possible in most of the smaller ceramic plants and might not be feasible in some of the larger ones.

We maintain close contact with the State Geological Survey and assist with the work of that department in the exploration of new deposits of raw materials. Such connection allows us to have help in the proper exploitation of the known deposits of ceramic minerals.

The members of other state associations are doing likewise. This is shown especially by the recent extension of geological studies of the mineral deposits of New Jersey.

In legislative affairs we can be helpful and effective because we are organized along State lines. Most of the legislation affecting our industry is of State rather than national scope. We can help influence members of the legislature in provision for the University as well as other departments of the State Government. We are concerned with the departments regulating factory operation, such as safety regulation, to mention only one. State associations can assist with the proper legislation to cover industrial hazards, as has been shown by the cooperative interest in the handling of silicosis. Strip-mining regulations which are now being considered may set a precedent which will affect clay pits and stone quarries. Here, too, state associations can propose constructive legislation.

The study of labor relations has become one of our most important functions. Not only must state groups approach labor problems from the legislative angle of health and safety but from the equally important viewpoint of efficiency and productiveness. State groups of manufacturers can be more effective in this respect than national groups owing to the differences in labor conditions in different sections of the country and differences in the operating problems involved. These associations are more helpful to ceramic manufacturers in such work than are the general state associations of manufacturers because of the better knowledge of individual operating conditions.

These associations perform another very important service for their members. They are the meeting places for the manufacturers of the industry. No modern industry can attain its full growth and live in comparative peace if operators are denied acquaintanceship and personal contact with their neighboring companies. Gatherings of ceramic manufacturers in state groups provide this place of meeting to exchange information and to promote harmony in the industry. In such a capacity the state associations have been especially useful.

As President of The American Ceramic Society, I have an increasing interest in such organizations. The Society has always been concerned with these organizations and has used its good offices to promote such groups. Although the work of The Society is different in most respects, it, like all other organizations, depends upon the industrial health of its members. The Society, therefore, has a permanent interest in the welfare of the state associations.

The present organizations have been so successful that ceramists in other states might take note. Perhaps West Virginia, Missouri, and Iowa, as well as California, could be considered as logical places for new associations. Such groups could take an active part in the many postwar problems which are developing.

May I recommend to manufacturers in other states the organization of such associations. We in Ohio have been so successful in this cooperative enterprise that we are sure those in other states will be benefited. The American Ceramic Society is ready to lend its aid in perfecting plans for such gatherings. Call on us for help.

C. Forest Jeffery

President

LOCAL SECTION NEWS

SCHEDULE OF LOCAL SECTION MEETINGS

Section and Place	Date
Upstate New York, Hornell	November 16
Pittsburgh, Pittsburgh	December 4
St. Louis, St. Louis	December 5
Northern Ohio, Cleveland	December 6
Northwestern Ohio, Toledo	December 6 and January
Central Ohio, Columbus	December 7
Chicago, Chicago	December 14
Southern California, Los Angeles	January

CHICAGO SECTION

The Chicago Section met October 5, 1945, at the Electric Club, Chicago Civic Opera House, Chicago, Ill., with dinner at 6:30 P.M.

We had a fine meeting involving wage incentives, in which Joseph C. Lewis, Associated Engineers, Inc., Fort Wayne, Ind., and George H. Gruendel, Associates in Personnel Compensation Planning, Chicago, Ill., gave timely talks.

The Owens-Illinois Glass Company film "You and Owens-Illinois" completed the program.

Rules and By-Laws for the Section also were adopted at this meeting.

The next meeting of the Chicago Section will be held Friday, December 14. It will center around talks by Gilbert E. Seil, Day & Zimmermann, Inc., Philadelphia, Pa., on "Combustion" and John R. Green, Brown Instrument Co., Pittsburgh, Pa., on "Modern Pyrometric Practice."

1945–1946 Committee Appointments

Executive Committee

R. P. STEVENS, *Chairman*, Chicago Retort & Fire Brick Co., Chicago, Ill.
RALPH L. COOK, Univ. of Illinois, Urbana, Ill.
J. J. SVEC, Industrial Publications, Inc., Chicago, Ill.
A. I. ANDREWS, Univ. of Illinois, Urbana, Ill.

Program Committee

RALPH L. COOK, *Chairman*, Univ. of Illinois, Urbana, Ill.
RAY A. WITSCHEY, A. P. Green Fire Brick Co., Chicago, Ill.
WALDO W. HIGGINS, A. O. Smith Corp., Milwaukee, Wis.

Social Committee

GEORGE G. HANSON, *Chairman*, Colorado Feldspar Co., Chicago, Ill.
HUGO FILIPPI, Illinois Brick Co., Chicago, Ill.
WESLEY G. MARTIN, A. O. Smith Corp., Milwaukee, Wis.

Membership Committee

MICHAEL BRISCH, JR., *Chairman*, Brisch Brick Co., Chicago, Ill.
D. G. BENNETT, Univ. of Illinois, Urbana, Ill.
W. J. PLANKENHORN, Federal Electric Co., Chicago, Ill.

Publicity Committee

J. J. SVEC, *Chairman*, Industrial Publications, Inc., Chicago, Ill.
DANA CHASE, Dana Chase Publications, Chicago, Ill.
CLIFFORD M. ANDREWS, Univ. of Illinois, Urbana, Ill.

—R. P. STEVENS, *Chairman*

INFRARED POTTERY FURNACE MAKES HISTORY BY BARBECUING STEER

The startling success of one of industry's ultramodern scientific devices, the infrared furnace, in the unusual role of barbecuing cattle has been revealed as the result of a recent Local Section meeting.

Arthur A. Wells (in profile) and infrared barbecued ox.

Outdoor infrared cooking of a 900-pound steer required only 10 hours, less than half the time gas utility officials estimated would be required with the orthodox gas oven.

The meat was pronounced done to a turn by the 200 guests, members of the Pittsburgh Section of The American Ceramic Society, who partook of the experimental roast at the East Liverpool Country Club (see the October, 1945 *Bulletin*, p. 398).

The infrared barbecue, utilizing gas thermal radiators to produce a surface heat of 2300°F., was designed to dramatize for the ceramic men the versatility of this new type of furnace, which is being widely installed in the pottery industry.

Walter H. Emerson, chief engineer of the Homer Laughlin China Company, East Liverpool, Ohio, is in charge of installing similar equipment at Homer Laughlin, which will greatly speed up the drying of pottery ware.

As chairman of arrangements for the Section meeting, Arthur A. Wells, general superintendent of Homer Laughlin, supervised the barbecue. A test roast had been made on a 69-pound wether, which was cooked in slightly less than 4 hours. A 4-pound leg of lamb takes 4 hours in the ordinary oven.

Disclaiming any intention to foresake the pottery business to operate barbecue stands or kitchens, officials of the pottery group feel it is just possible they may have pioneered a new era in postwar cooking.

C. Forrest Tefft (*right*), President of The American Ceramic Society, presents charter to Joseph A. Pask, Chairman of the New York Metropolitan Section.

NEW YORK METROPOLITAN SECTION

The New York Metropolitan Section was organized Wednesday, October 17, 1945, at a meeting at the Building Trades Employers Association Building. C. Forrest Tefft, President of The American Ceramic Society, presented the charter to Joseph A. Pask, Acting Chairman.

Following the charter presentation, Emerson W. Emrich, R. T. Vanderbilt Laboratories, took charge of the meeting and presented the report of the Nominating Committee. The following officers were elected:

Chairman: JOSEPH A. PASK, Research Dept., Lamp Div., Westinghouse Electric Corp., Bloomfield, N. J.

Vice-Chairman: JAMES D. TETRICK, Metal & Thermit Corp., Carteret, N. J.

Secretary-Treasurer: PERRY C. MCCOLLOM, American Crucible Co., Shelton, Conn.

Councillors

JAMES B. AUSTIN, Research Lab., U. S. Steel Corp., Kearny, N. J.

CHESTER C. TREISCHEL, R. T. Vanderbilt Co., New York, N. Y.

Mr. Pask announced that the officers would act as the Executive Committee and would meet soon to determine the program for the season. He also stated that supporting committees would be appointed. He then read letters and telegrams from the various other Local Sections of The Society extending greetings to the New York Metropolitan Section.

In commenting, Mr. Tefft remarked that this was the thirteenth Local Section to be organized. He then asked the members to give attention to the technical study and research needs of the industry, especially following the remarkable progress made in glass and enamel.

Jan S. Irvine spoke on "Fiberglas and Its Applications."

Mr. Irvine demonstrated the many uses of Fiberglas with samples which he had with him. Of special interest to the ladies present were glass powder puffs.

The meeting adjourned with an attendance of 84.

PITTSBURGH SECTION AUTUMN MEETING

The largest and most successful meeting in the history of the Pittsburgh Section was held at Mellon Institute, Friday, October 12, with 175 attending the Technical Session.

At the Joint Session, called to order at 1:30 P.M., H. E. Simpson, Section Chairman, introduced Dwight G. Bennett, research professor, Department of Ceramic Engineering, University of Illinois, Urbana, Ill., who spoke on "Some Special Wartime Investigations of Ceramics." In this paper, Mr. Bennett described the work conducted in conjunction with the Army Air Forces, leading to the development of enamel-type metal protective coatings featuring low infrared emissivity at high temperature. A second phase of the paper described the development of ceramic bodies capable of satisfactory resistance to temperature changes of as much as 2000° in 30 seconds.

Following the Joint Session, the Glass Division, with Harold Simpson as Chairman, met in the Auditorium, while the Refractories and White Wares Divisions met in Room 353, with John Jordan acting as Chairman.

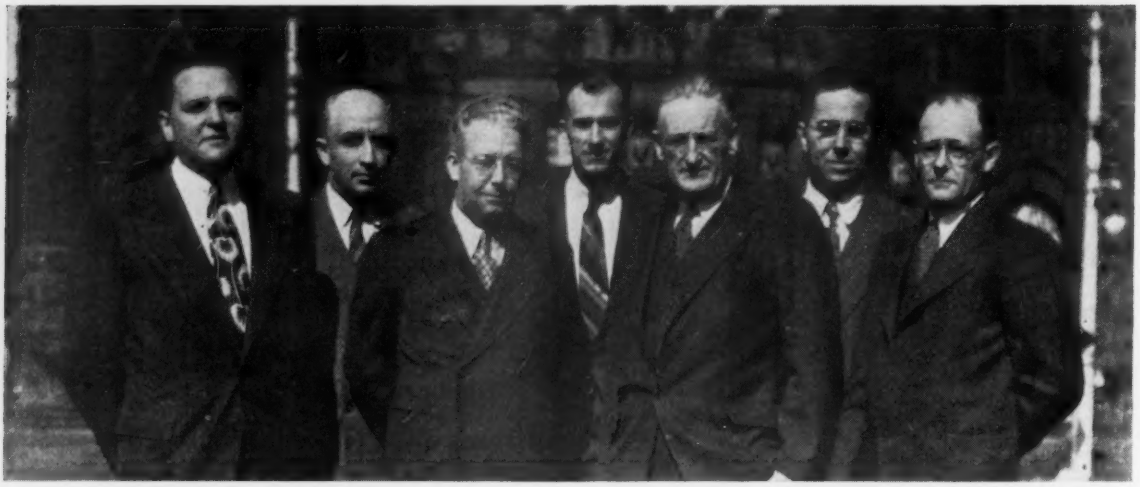
Papers presented to the Glass Division were as follows:

(1) "Effect of Iron on Fluorescence in Glass" by L. THORINGTON AND R. RUSSELL, JR., Research Labs., Westinghouse Electric Corp., East Pittsburgh, Pa., AND ALEXANDER SILVERMAN, Dept. of Chemistry, Univ. of Pittsburgh, Pittsburgh, Pa.

(2) "Resistance of Plate Glass to Alkaline Solutions" by A. JUNGE AND M. S. TARNOPOL, Pittsburgh Plate Glass Co., Research Dept., Creighton, Pa.

(3) "Thermal Emissivity of Glass and Plastics" by H. NOBLE, research assistant, Physics Dept., Ohio State Univ., Columbus, Ohio, by Pittsburgh Plate Glass Co.

(4) "Annealing Strains in Glass and Their Degree of Permanence. Measurements of Optical Retardation over a Seven-Year Period in Glass Container Manufacturers' Standardized Disks" by L. G. GHERING, Preston Laboratories, Butler, Pa., AND T. D. GREEN, Hartford-Empire Co., Hartford, Conn.



Pittsburgh Section Officers and Committee Chairmen. (*Left to right*): Norbert S. Garbisch, Garco Products, Inc., Chairman, Entertainment Committee; A. Paul Thompson, Mellon Institute, Chairman, Dinner Committee; H. E. Simpson, Mellon Institute, Section Chairman; J. W. Jordan, Mellon Institute, Section Vice-Chairman; L. A. Smith, Jones & Laughlin Steel Corp., Section Treasurer; J. S. Nordyke, The Eagle-Picher Co., Chairman, Publicity Committee; H. M. Parkhurst, General Refractories Co., Section Secretary.

(5) "Tracing the Flow in Glass-Tank Furnaces" by F.L. BISHOP, JR., American Window Glass Co., Arnold, Pa.

A sound movie "Glass Manufacture in England and the Sheffield School of Glass Technology" was presented through the courtesy of J. C. Hostetter, Mississippi Glass Co., St. Louis, Mo.

The Refractories and White Wares Divisions heard the following papers:

(1) "Testing Chrome-Magnesite Brick for Resistance to Iron Oxide Bursting" by SAMUEL ZERFOSS AND H. M. DAVIS, Pennsylvania State College, State College, Pa.

(2) "Developments in Superduty Silica and High-Alumina Refractories' by C. A. BRASHARES, Harbison-Walker Refractories Co., Pittsburgh, Pa.

(3) "Water Spotting of Semivitreous Dinnerware in the Decorating Process" by WILLIAM D. SPORE, Homer Laughlin China Co., Newell, W. Va.

(4) "Investigation of Long-Chain, Short-Chain Binders for Extruded Steatite" by R. E. LONG, Stupakoff Ceramic & Mfg. Co., Latrobe, Pa.

(5) "Shrinkage of Extruded Steatite Tubes" by HENRY H. HAUSNER, General Ceramics & Steatite Corp., Keasbey, N. J.

A meeting of the Glass Division Research Committee scheduled for 12:00 M. was cancelled because of the absence of Kenneth C. Lyon, Armstrong Cork Co., Millville, N. J. Other members are Alexander Silverman, *Chairman*, University of Pittsburgh; C. E. Leberknight, Kopp Glass, Inc., Swissvale, Pa.; and O. G. Burch, Owens-Illinois Glass Co., Toledo, Ohio.

Announcement was made of a meeting of officers and committeemen of the White Wares Division to be held at Mellon Institute, Saturday, October 13.

The Editorial Standards Committee of the National Society also met Saturday morning for discussion of its activities. Present were A. P. Thompson, *Chairman;* R. M. Campbell, and E. C. Henry.

The Ladies' Night dinner and dance held at the University Club beginning at 6:30 P.M. found 212 in attendance. With an excellent steak dinner (only two held to their convictions and ordered fish), suitable refreshments, and the music of a fine dance band, the climax to the day's activities was a complete success. Norbert Garbisch, acting as Master of Ceremonies, paid fitting tribute to Harold Simpson, Arthur Wells, Keith McAfee, Francis Flint, and Paul Thompson, neglecting to mention himself, whose combined efforts assured the success of the entire affair.

He also introduced visitors from outside the Pittsburgh Section, who included Charles S. Pearce, Associate Secretary, The American Ceramic Society, and Mrs. Pearce, Columbus, Ohio; J. C. Hostetter and Frank O'Leary, Mississippi Glass Co., St. Louis, Mo.; Dr. and Mrs. R. M. Campbell, Dr. and Mrs. M. J. Rice, and Dr. and Mrs. S. R. Scholes, New York State College of Ceramics, Alfred, N. Y.; Mr. and Mrs. O. G. Burch, Owens-Illinois Glass Co., and Howard Swift, Libbey-Owens-Ford Glass Co., Toledo, Ohio; William H. Horak and T. D. Green, Hartford-Empire Co., and Jim Bailey, Plax Corp., Hartford, Conn.; H. Noble, Ohio State University, Columbus, Ohio; Sergeant Golightly, Ford City, Pa; Stephen M. Swain, North American Refractories Co., Cleveland, Ohio; W. S. Debenham, Carnegie-Illinois Steel Corp., Chicago, Ill.; Pedro Compos, Mexico City, a student at Alfred; Dick Carothers and Ed Klocke, H. C. Spinks Clay Co., Newport, Ky.; John R. Hostetter, U. S. Glass Co., and Lt. Donald Morgan, U. S. Navy, Washington, D. C.; E. L. Hettinger, Willson Products, Inc., Reading, Pa.; Howard Lillie, Chairman of the Upstate New York Section, and J. N. Ferguson, both of Corning Glass Works, Corning, N. Y.; and R. R. Danielson, Metal & Thermit Corp., Carteret, N. J.

Following the introduction of visitors, Mr. Garbisch read a telegram received from Redlands, Calif.:

> The Redlands Sub-Section sends greetings and best wishes.
>
> (Signed) ELEANOR CALGAN,
> KATHRYN AND KEITH MCAFEE,
> BILL AND GLADYS WALLACE

The remainder of the evening was devoted to dancing and to individual enterprise.

—J. S. NORDYKE, *Chairman, Publicity Committee*

DESIGN DIVISION OF SOUTHERN CALIFORNIA SECTION

A meeting of the Design Division of the Southern California Section was held October 15, 1945, in Harris Hall, Art and Architecture Bldg., University of Southern California, Los Angeles, Calif.

David F. Welch, Industrial Designs Associates, Pasadena, Calif., spoke on "Application of Industrial Design to the Ceramic Industry." A discussion period followed his lecture.

PITTSBURGH SECTION DECEMBER MEETING

Tuesday night, December 4, will be Penn State Night for the Pittsburgh Section. A tribute to ceramic activities at Pennsylvania State College and those who make them possible will be the order of the evening.

Woldemar Weyl, research director of Glass Science, Inc., will speak on "Adhesion to Glass," and Herbert Insley, head of the Department of Earth Sciences at Penn State, will discuss "Solubility and Rate of Solution of Refractories in Molten Glass."

Also included in the business of the evening will be election of officers for the 1946 season.

The meeting will be held at Mellon Institute at 8:15 P.M. following a dinner at Webster Hall at 6:30 P.M.

—J. S. NORDYKE, *Chairman, Publicity Committee*

(See page 440 for additional Local Section News)

A WELCOME LETTER FROM DR. MAURACH

Dear Dr. Hostetter:

The terrible war in Europe is ended. We suffer no more the dreadful bombardments and the terror of military actions. Our area is occupied by American troops and we hope with confidence that soon there will be a peaceful life for us all. By the consent of Colonel Thomas, commander of the occupying troop in this place, I write this letter to you. I wish first to send many hearty greetings to Mrs. Hostetter, to you, and to all of my other not-named friends. I will resume valuable friendships and good relations, remembering cheerful hours and happy days.

As did many of our compatriots, we lost a great deal of our goods in Frankfurt am Main. In 1942, we transferred our office with the irreparable library, scientific papers, and other important materials to Schöllkrippen, a very little place nearly thirty-five miles east of Frankfurt. Here we enjoy the shelter and protection of the American Government and Army in an agreeable manner. In a small country house Mrs. Maurach and myself found a modest habitation. We thank God that He has saved our lives and health. It was His will to take our two loved sons. We wait for the day of our return to Frankfurt.

It is my duty to resume my business as soon as living conditions become normal in Frankfurt. A recommendation from you as a member of the International Commission on Glass Technology or The American Ceramic Society or an American statesman, addressed to the Headquarters in Frankfurt am Main, will be necessary.

(Signed) HEINRICH MAURACH

EDITORIAL NOTES

I. The German Society of Glass Technology and the Hüttentechnische Vereinigung der deutschen Glasindustrie, both in Frankfurt am Main, Untermainkai, 12, founded in 1920, enjoyed before the war the collaboration of The American Ceramic Society, Columbus, Ohio, U.S.A., for the international promotion of the sciences on glass.

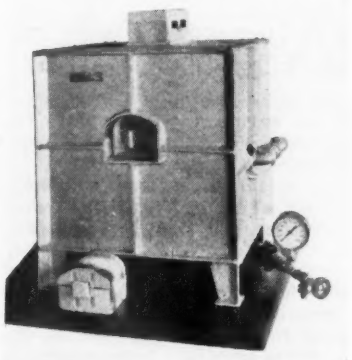
II. The American Ceramic Society conferred in 1928 a Complimentary Membership upon the German Society of Glass Technology.

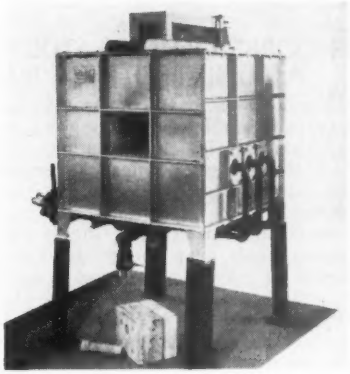
III. Dr. Ing. Heinrich Maurach, the well-known leader of the German Society of Glass Technology, will in the future, as in the past, be a decisive influence in the industrial and technical development of German glass production.

Dr. Maurach was elected in 1933 Honorary Secretary of the International Glass Commission and in 1937 was elected an Honorary Fellow of the Society of Glass Technology (Sheffield, England).

REMMEY LABORATORY KILNS

No. 2150 **No.2320**





6½″ x 4½″ x 4½″ high	—	**SETTING SPACE**	—	18″ x 12″ x 9″ high
City, Natural or Propane Gas	—	**FUEL**	—	City, Natural or Propane Gas
1200°F. to 3200°F.	—	**TEMP. RANGE**	—	1200°F. to 3200°F.

No. 2150 (small kiln) For the laboratory that must get results rapidly.
No. 2320 (larger kiln) For burning large Specimens or quantities of samples.
Both kilns are capable of burning any kind of ware, economically, over an extremely wide temperature range.

Dependable Refractories

RICHARD C. REMMEY SON CO.

Hedley Street and Delaware Ave. PHILADELPHIA 37, PA.

(1945)

CERAMIC SCHOOLS

RUTGERS CERAMIC CLUB AND STUDENT BRANCH

The Rutgers Ceramic Club and Student Branch of The American Ceramic Society, the first student group to become active since the war, was reorganized at New Brunswick, N. J., Monday evening, October 15, 1945. There were fourteen students present. Dean Parker H. Daggett announced the transfer of the ceramic school to the College of Engineering and expressed satisfaction with the prospect of ceramic engineers from Rutgers taking their places beside the other engineering graduates.

John H. Koenig, new head of the Department of Ceramics, explained the plans for the group for the year which include two meetings a month, one of which will be attended by representatives of the ceramic industry in this section.

A telegram of greeting from Ross C. Purdy, General Secretary of The American Ceramic Society, was read. Charles S. Pearce, Associate Secretary of The Society, brought greetings from the officers and staff.

Professor Ubert C. Holland of the College of Engineering welcomed the ceramic students to his courses.

A film showing the manufacture of Lenox ware was shown with two action films from the Navy Department. Following the meeting, refreshments were served by the student body, assisted by the secretary of the Department, Miss Emma Nawrot.

—HERBERT A. OMLEY,
Acting President

Rutgers Ceramic Club and Student Branch of The American Ceramic Society

(Seated, left to right): **W. J. Gyurk, R. L. Harrison, R. B. Lippincott, Jr., H. A. Omley, Dr. J. H. Koenig, Prof. L. E. Kane, J. E. Comeforo.** ***(Standing, left to right):*** **J. E. Seasholtz, W. F. Bennett, R. F. Fouratt, W. A. Doerrhoefer, J. E. Neal, H. T. Van Horn, W. S. Netter, S. E. Laster.**

AIR CORPS OFFICERS STUDY CERAMICS AT UNIVERSITY OF ILLINOIS

Three officers from the Army Air Corps are graduate students in ceramic engineering at the University of Illinois, Urbana, Ill., this autumn. All have agreed to remain in the Army for at least three more years, and the training will fit them to become the Air Corps' specialists in ceramics.

As officers on active duty, they have been assigned to go to college this year and receive the training and earn the degrees of master of science in ceramic engineering. All are college graduates. A month of refresher training preceded the beginning of their graduate work.

The University of Illinois was chosen as the institution to give the ceramic training. Similar teams of experts, who will remain in the service, are being trained in other fields at other colleges throughout the country.

The officers are Lt. Col. R. A. Schmidt, Dayton, Ohio, Marquette University graduate; Capt. L. C. Bearer, Trafford, Pa., University of Pittsburgh graduate; and 1st Lt. R. S. Hower, Osborn, Ohio, Ohio State University graduate.

AMERICAN CHEMICAL SOCIETY

A national meeting of the American Chemical Society will be held in Atlantic City the week of April 8, 1946.

The Annual Meeting will be held in Chicago, September 8 to 15, 1946.

OHIO STATE UNIVERSITY WILL OFFER GLASS TECHNOLOGY STUDY

Preparing for the early offering of a new curriculum in glass technology and engineering, Ohio State University October 13 announced the appointment of Henry H. Blau to the position of professor of glass technology.

Dr. Blau, vice-president in charge of manufacture and research for the Federal Glass Co., Columbus, Ohio, is dividing his time between the Company and the University.

In providing thoroughly trained engineers for the rapidly expanding glass industry, Ohio State University continues the pioneering program started fifty years ago when it introduced the first college courses in ceramic engineering to be offered anywhere in the world.

When the plan of inaugurating a division of glass technology in Ohio State's College of Engineering was proposed. a council was developed consisting of nationally prominent glass manufacturers and glass scientists. The advice of these practical glassmen has guided the formulation of the Ohio State program.

The new Ohio State University faculty member has the bachelor of science degree from the Carnegie Institute of Technology, the master of science degree from the Massachusetts Institute of Technology, the professional degree of chemical engineer from the Carnegie Institute of Technology, and the degree of doctor of philosophy from the University of Pittsburgh.

His contributions to the advancement of glass tech-

Henry H. Blau

nology are indicated by his thirty American, thirteen Canadian, and numerous British, German, and other foreign patents and his fourteen published articles on glass.

He is a member of the Institute of Chemical Engineers, the Illuminating Engineering Society, the American Chemical Society, a Fellow of the British Society of Glass Technology, and a Fellow of The American Ceramic Society.

For four years Dr. Blau has been with the Federal Glass Company, in charge of research and manufacturing. Previously he had been for twenty-one years with the Macbeth-Evans Glass Company and with the Corning Glass Works after the merger of the two companies. His duties during that period included research, its development and direction, as well as executive manufacturing duties on a varied line of glass products such as illuminating and signal glassware, heat- and chemical-resistant glassware, glass tableware, structural glass block and tile, glass color filters, ultraviolet and infrared absorbing and transmitting glasses, and other products.

A more complete biographical sketch of Dr. Blau, including his publications and patents, was published in the December, 1943, Bulletin, pp. 404–405.

RESEARCH CORPORATION OFFERS GRANTS FOR POSTWAR COLLEGIATE RESEARCH

Scientists who made the atomic bomb, radar, and many other vital war weapons now have an opportunity to return promptly to college laboratories for scientific research and teaching through $2,500,000 in grants offered to educational institutions by the Research Corp., 405 Lexington Ave., New York 17, N. Y., a nonprofit organization devoted to advancing research and technology by the use of revenues from inventions assigned to it by public-spirited inventors.

Preference in making these grants is being given, other factors being equal, to smaller institutions and those of more limited financial resources for research.

The five-year program will result in 100 to 200 grants of $2500 to $5000 each year so that talented young scientists, engaged for the most part in war research in uniform or as civilians, can undertake at universities and colleges research of peacetime importance in pure science, especially chemistry, physics, mathematics, and engineering.

The grants are being made by a special committee of eminent scientists from industrial and university laboratories. The committee is composed of the acting president of the Research Corporation, Joseph W. Barker, who is also dean of engineering at Columbia University; Thomas H. Chilton, director of engineering for E. I. du Pont de Nemours & Co., Inc.; William D. Coolidge, X-ray consultant for the General Electric Company; Timothy E. Shea, manufacturing engineer of the Western Electric Company; Lloyd P. Smith, associate research director of the Radio Corporation of America; Col. Stafford L. Warren, professor of medicine at the University of Rochester; and Robert R. Williams, inventor of the synthesis of vitamin B_1 and coordinator of research of the Research Corporation.

Grants are being made to the institutions at which the scientists work and teach. The funds allotted are available for the purchase of needed equipment and for the employment of assistants either as fellows or otherwise. Awards are being based primarily upon the demonstrated ability of the men who conduct the researches and contribute to the teaching program of the school.

PREDOCTORAL FELLOWSHIPS IN THE NATURAL SCIENCES

The National Research Council is now ready to receive nominations and applications for the predoctoral fellowships in the natural (i.e., mathematical, physical, and biological) sciences which it is administering under a grant from the Rockefeller Foundation. These fellowships are intended to assist young men and women, whose graduate study has been prevented or interrupted by the war, to complete their work for the doctorate. It is hoped that these fellowships will do much to accelerate the recovery of the scientific vigor and competence of the country which is so seriously threatened by the loss of almost two graduate-school generations of scientifically trained men and women.

This program will be administered by a Committee on Predoctoral Fellowships of the National Research Council whose members are Henry A. Barton, Charles W. Bray, Detlev W. Bronk, Luther P. Eisenhart, Ross G. Harrison (Chairman, National Research Council, ex officio), W. A. Noyes, Jr., and John T. Tate, Chairman; Enid Hannaford, Secretary.

The annual stipend will be $1200 for single persons and $1800 for married men. In general it is expected that each recipient will spend at least eleven months per year on academic work. An additional allowance up to $500 per year will be made for tuition and fees. Fellowships granted to individuals who are eligible for educational support from the "G.I. Bill of Rights" will be at such stipends as to bring the total income from these two sources to that which would be received at the foregoing rates.

Information concerning these fellowships and Nomination-Application blanks are being mailed out widely to graduate schools and wartime research laboratories. They may also be obtained by writing directly to the Secretary, Committee on Predoctoral Fellowships, National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C.

CORPORATION MEMBERS

CORNING ACQUIRES INTEREST IN SOUTH AMERICAN PLANT

The third important development since 1943 in Corning Glass Works' expansion program in South America has been completed with the purchase recently of a substantial interest in Cristalerias de Chile, largest glass manufacturer in that country.

Details of Corning's new acquisition have been made public by William H. Curtiss, vice-president and secretary of the Company. The majority control of the Chilean company will be retained by the original owners in South America. Corning will be represented on the Board of Directors by Lawrence King, managing director of the company's entire South American interests.

Corngin's first move in the South American field took place two years ago when it acquired, under similar circumstances, a minority interest in Argentina's foremost glass company, Cristalerias Rigolleau of Buenos Aires. Early in the autumn of 1944, a comparable investment was made in Brazil's leading glass company, Vidraria Santa Marina of São Paulo. Unlike the Argentine and Brazilian companies, stock of Cristalerias de Chile is widely held. Founded in 1901, the company ranks as one of the best established in South America.

All three investments by Corning were made through Corning Glass Works of South America, which was organized to handle the company's expanding program in the southern hemisphere. According to Mr. Curtiss, president of the South American subsidiary, Corning's rapid progress in South America was primarily the result of adherence to policies designed to foster cooperation and mutual confidence.

Certain patents, technical assistance, and inventions of Corning Glass Works will be placed at the disposal of Cristalerias de Chile. In addition, Corning will design furnaces and other equipment which will enable the Chilean company to manufacture many of Corning's well-known glass products, such as Pyrex-brand heat-resistant glass, laboratory glassware, and improved tableware.

An essential part of the arrangement with all three South American affiliates is an exchange of engineering and technical talent. Corning Glass Works has already sent engineers and physicists to its affiliates in Chile, Brazil, and Argentina, and the foreign companies are now sending top operating personnel to Corning to secure firsthand information and training. Several have already spent periods of observation and training in the Corning plants.

Cristalerias de Chile's major products at the present time are bottles, jars, and other types of glass containers; hand-blown tableware; and glass bulbs and tubing for incandescent lamps which are also blown by hand. As soon as its personnel is properly trained, the company will be supplied with equipment designed to produce many of these products mechanically. Some of this equipment is already on order with North American machine-building companies.

HARSHAW CHEMICAL COMPANY RECEIVES AWARDS

The Harshaw Chemical Co., Cleveland, Ohio, has been awarded the Army-Navy "E" flag with four stars by the Manhattan Engineers District for its research, development, and production work on the atomic bomb.

About twenty companies in the country have received this flag. The Harshaw Chemical Company is the only Ohio recipient.

This Company also has received the Army-Navy "E" for high achievement in war production.

LIBBEY-OWENS-FORD EXPANDING FOR RESEARCH WORK

The Libbey-Owens-Ford Glass Co., Toledo, Ohio, is planning to intensify and enlarge its research activities by the construction of expanded technical laboratory and experimental facilities. Cost of new construction, including facilities, laboratory equipment, and offices, is estimated at $250,000.

Libbey-Owens-Ford engineering is under the direction of John L. Drake, director of engineering, with William Hasselbach as chief engineer.

The Research Department is headed by George B. Watkins and three assistant directors, J. D. Ryan, who specializes in research in transparent plastics and plasticizers; Donald E. Sharp, who heads the technology group; and R. W. Wampler, who is in charge of research in new glass products.

The Development Department is under the direction of Ormand H. Paddock. It operates in close collaboration with the Manufacturing and Sales Departments and the other branches of Libbey-Owens-Ford's technical organization.

Additional building space and equipment recently constructed and about to be built for research and experimental work are essential so that the Company may maintain its advanced position in glass research and mechanical developments; increase its research in the field of plastics; and continue development of new products, together with improvements in its manufacturing and production techniques.

PERSONNEL CHANGES AT ABRASIVES PLANTS

R. H. White, a member of The American Ceramic Society since 1916, retired from the Abrasive Co., Philadelphia, Pa., August 1, 1945; he was succeeded by W. J. Thomson. Joe McLean retired November 1 and was succeeded by Clarence F. Fee.

C. Leonard Shaw has been appointed publicity manager of the Norton Co., Worcester, Mass., to succeed A. B. Fritts, who retired recently after thirty-seven years.

FOOTE MINERAL OFFICE MOVES

The Foote Mineral Co., Philadelphia, Pa., processor of metals, alloys, ores, and chemicals, has moved its entire office to 12 E. Chelten Ave., Philadelphia 44, Pa.

PUBLIC RELATIONS DEPARTMENT ESTABLISHED AT CORNING

Corning Glass Works September 4 announced the establishment of a Public Relations Department and the appointment of Thomas F. Robertson as manager.

The Department, with headquarters at the company's home offices in Corning, N. Y., will be responsible for the handling of news, institutional advertising, publicity, internal and external publications, and other public relations activities.

Mr. Robertson became associated with Corning Glass works $4\frac{1}{2}$ years ago in an advertising capacity and was in charge of news and publications at the time of his new appointment. His former business activity includes editorial and advertising functions at Prentice-Hall, Inc.; publication of a weekly newspaper; sales management work with the Pillsbury Flour Mills Company; and sales promotion with Remington Rand, Inc.

G. F. RIEMAN SERVES BALL BROTHERS IN NEW CAPACITY

G. Fred Rieman has been appointed director of the Fruit Jar and Domestic Products Division of Ball Brothers Company, whose general offices are in Muncie, Ind. Mr. Rieman will direct and coordinate production planning, research, merchandising, and the postwar developments of the Company's domestic products. Frank E. Burt, with his regular staff, will continue as sales manager of the Division.

In October, 1943, Mr. Rieman was granted a leave of absence by Ball Brothers Company to serve as assistant director of the War Production Board Containers Division. He spent eight months in Washington, D. C., in carrying out that assignment, made upon recommendation of the Glass Container Association.

Before his association with Ball Brothers Company, he was vice-president of the Anchor Hocking Glass Corp., Lancaster, Ohio. He joined Ball Brothers Company in 1939 as assistant vice-president.

G. Fred Rieman

HOUSE OF GLASS OPENED IN MACY'S

The House of Glass, a cooperative venture of Macy's New York and the Libbey-Owens-Ford Glass Company, was opened September 17 in the New York department store.

Located permanently on the store's eighth floor, it is believed to be the first department in a retail store to feature the correlated showing of glass and mirror items customarily sold in a dozen sections of one store.

For the first time, it is possible to procure in a single place all types of flat glass, from entire window walls of the insulating glass, Thermopane, to glass place mats for the table.

Specialists in the House of Glass will submit plans for the installation of these items and an installation service also will be available.

(1945)

ENAMELERS

PORCELAIN ENAMEL INSTITUTE FORUM

The Seventh Forum of the Porcelain Enamel Institute will be held at The Ohio State University, Columbus, Ohio, Wednesday, Thursday, and Friday, November 28, 29, and 30, 1945. The auditorium of the Social Administration Building will be used for the meetings.

Headquarters for out-of-town members will be at the Neil House, and the regular banquet on Thursday evening will be held there.

This is the first Forum to be held since October, 1941. Conditions have changed greatly. Hotels are crowded and facilities for serving meals are not up to the prewar standard, but the program will be as well planned as ever. It will be constructed around the idea of a refresher course for those who have been doing work other than enameling during the war. There will be considerable discussion of the changes in processing that have taken place in the last four years and the rearrangements that are necessary to adapt operations to peacetime conditions.

In the past, the Forum has been the high spot in the educational program for men in the porcelain enamel industry. It is probable that it will assume its former importance with the holding of this first postwar meeting and will be attended by large delegations from all branches of the industry.

EASTERN ENAMELERS' CLUB

Preceded by a luncheon, at which H. B. Brown, merchandise manager, Philco Corporation, Philadelphia, Pa., was the principal speaker, the Eastern Enamelers' Club met for the first time since war placed restrictions on transportation and adopted a new set of By-Laws and elected officers for the coming year.

The meeting, which was held September 22, 1945, at the Ritz-Carlton in Philadelphia, was attended by a near-record membership. By unanimous vote, the Club adopted the recommendations of the Nominating Committee headed by Paul Seasholtz and elected Nathan R. Klein, Caloric Gas Stove Works, President; Fred Campbell, American Rolling Mills, Vice-President; J. L. Larduskey, Baltimore Porcelain Steel, Secretary; and George H. Spencer-Strong, Pemco Corporation, Treasurer. As presiding officer of the meeting, Mr. Klein offered suggestions for utilizing the full potentialities of the Club; these also were adopted without dissent. At the same time, it was tentatively agreed that the next meeting of the Club be held the first week in December either in Baltimore or New York.

This was one of the most interesting meetings held since the Club's inception, and in the choice of Mr. Brown as speaker the Club set a standard that will place a real burden upon the Program Committee for future meetings. Mr. Brown, in his talk, painted a bright picture of the future. He emphasized the vast strides that have been made during the war in production methods and the development of hundreds of new ideas that will at some near future date be available as practical improvements definitely affecting our daily lives. Although Mr. Brown stressed the vast pent-up purchasing power of the public, he particularly called attention to the need for immediate "selling" to break down the present inertia in the movement of merchandise due to the public's desire "not to buy now but to wait until the new things have been thoroughly tried."

Future meetings of the Club should hold an intense interest for every individual either directly or indirectly connected with the porcelain enameling industry. The Program Committee, headed by Herbert Turk, Pemco Corporation, has already begun to correlate the suggestions made at this meeting and promises the next meeting will be of equal importance.

SERVICE TO MEMBERS

. . . MEMBERS of technical societies are beginning to study the services which these organizations render. This is a discriminating approach resulting in an appraisal of the value of such services to the particular member.

The societies of the country will obtain much good from this attitude on the part of interested members. Where obsolete services have been continued, they will be discovered and eliminated. New services will then be possible.

The American Ceramic Society welcomes this discriminative approach. The officers and the staff appreciate constructive criticism from the membership as the only method by which services can be evaluated.

The large increase in membership in 1944 and 1945 presents many opportunities. You can help by studying the services of The Society and expressing your opinions.

In the meantime, a steady stream of new members continues to come into The American Ceramic Society with the assurance that they will receive a profitable service.

PAID MEMBERSHIP AND SUBSCRIPTION RECORD

Date of Record	Members Paid		Deferred	Subscriptions	Monthly Sales	Total Circulation
	Personal	Corporation				
October 21, 1944	2261	393	3	605	220	3482
December 21, 1944	2317	402	2	661	220	3602
August 21, 1945	2416	416	3	643	220	3698
September 21, 1945	2449	417	2	654	220	3742
October 21, 1945	2483	419	0	652	220	3774
12-month % increase	9.8%	6.6%		7.8%		8.4%

NEW MEMBERS IN OCTOBER

Corporation

HUFFORD MACHINE WORKS, INC., J. A. Helget (voter), Redondo Beach, Calif.

POTTERY MANAGERS' & OFFICIALS' ASSOCIATION, Joseph S. Adams (voter), Sandon Lodge, Blythe Bridge, Stoke-on-Trent, England.

TEGELLABORATORIET VID IVA, Christer Enberg (voter), Tegellaboratoriet, IVA, Stockholm 5, Sweden.

Personal

ANDRES, ADELE M., 1356½ S. Orange Dr., Los Angeles, Calif.

AVAKIAN, VICTORIA, School of Architecture and Allied Arts, Univ. of Oregon, Eugene, Oreg.

BALDRY, STANLEY F. T., 1021 A Finchley Rd., London, N.W.11, England; director of research, ERG Resistors, Ltd.

BONNER, DON B., Roger Engineering Co., 2149 East 37th St., Los Angeles 11, Calif.; owner.

CHILDS, H. W., United Feldspar & Minerals Corp., West Paris, Maine (membership formerly in name of F. E. Haag).

DIRATS, ELWYN, 120 W. Silver, Westfield, Mass.; Dirats Mfg. Co.

*EVANS, CHARLES E., 222 16th Ave., Columbus, Ohio; Titanium Alloy Mfg. Co.

*FITZPATRICK, WILLIAM D., 204 Ceramics Bldg., Univ. of Illinois, Urbana, Ill.

FLEMING, MAJOR CHARLES A., 1105 Halcyon Ave., Nashville, Tenn.

FORJAZ, NICOLAU, Porto Ferreira. C.P., C.E. São Paulo, Brazil.

GALLY, J. A., 2390 E. Villa St., Pasadena 8, Calif.; Wildwood Pottery.

HAWKINS, WILLIAM A., 658 S. Lake Ave., Pasadena 5, Calif.; clay sketches.

HOFFMANN, FRED P., General-Wille-Strasse 19, Zurich 2, Switzerland.

*HUNT, FRANK S., 2780 Estado St., Pasadena 8, Calif.; Whiting-Mead Pottery Co.

LEATHAM, EARL, Apt. F-18, Brentshire Village, Pittsburgh 10, Pa.; research engineer, Harbison-Walker Refractories Co.

LOOMIS, WAYLAND E., Hartford-Empire Co., Hartford 1, Conn.

MERLINI, FRANCESCO, Soc. Ceramica Richard Ginori, Doccia-Colonnata, Florence, Italy.

*PARSONS, DOUGLAS E., Clay and Silicate Products Div., National Bureau of Standards, Washington 25, D. C.

RENOUF, LEONARD J., Church St., Youngstown, N. Y.; Titanium Alloy Mfg. Co.

SABOL, MAJOR FRANK P., 414 F St., S.W., Ardmore, Okla.

STACH, MAJOR OTTO R., Erie Proving Ground, Lacarne, Ohio; U. S. Army.

STEVENSON, CHARLES E., Diamond Glass Co., Royersford, Pa.

*TURNER, DRURY D., Esperson Bldg., Houston, Texas; manager, Red Head Mud Co.

WHITFIELD, PFC. R. E., 414 N. Worth St., Sullivan, Ill.; U. S. Army.

WOHLFERTH, HARRY C., 1019 Dean St., Schenectady 8, N. Y.; General Electric Co.

Student

New York State College of Ceramics: ALEXANDER GIAMPIETRO, JOHN B. LAWRANCE.

Rutgers University: HERBERT A. OMLEY.

University of Illinois: RAYMOND A. SCHMIDT.

University of Southern California: RICHARD B. LETTERSON.

* Indicates former member of The Society rejoining.

(1945)

MEMBERSHIP WORKERS' RECORD

CORPORATION: R. Russell, Jr. 1, Office 2.

PERSONAL: A. E. Baggs 1, W. J. Baldwin 1, R. E. Birch 1, George Blumenthal 1, C. S. Chaffee 4, J. Higgins 1, J. H. Koenig 1, W. W. Kriegel 1, S. B. LeCompte, Jr. 1, K. E. Peiler 1, F. K. Pence 1, J. C. Richmond 1, E. E. Thuener 1, W. E. S. Turner 1, Office 8.

STUDENT: A. I. Andrews 1, V. D. Fréchette 1, J. H. Fuenzalida 1, J. H. Koenig 1, Hildred Reents 1.

GRAND TOTAL: 33.

ROSTER CHANGES IN OCTOBER*

Personal

BREEZE, LEWIS K., A. O. Smith Corp., Milwaukee 1, Wis. (Euclid, Ohio)

BROWN, DAVIS, 136 S. Spruce Ave., Montebello, Calif. (Los Angeles, Calif.)

BURCHFIEL, COMDR. B. M., 600 Bryant St., San Francisco 7, Calif. (Denver, Colo.)

FLORENCE, JACK M., 1903 S. 19th St., Terre Haute, Ind. (Philadelphia, Pa.)

FRANKEL, H. D., 1515 N. Meridian St., Indianapolis, Ind. (New York, N. Y.)

GIBBS, A. E., 2 Down Cottages, Lansdown, Bath, Somersetshire, England (Philadelphia, Pa.)

INGHAM, DAVID M., 2927 St. Paul St., Baltimore 18, Md. (Ripley, N. Y.)

KERR, VAUGHN W., R. D. 2, Port Allegany, Pa. (Mt. Lebanon, Pa.)

MULVANE, O. E., 4138 N. 21st Street, Milwaukee, Wis. (West Lafayette, Ohio)

NETTER, WILLIAM S., 3840½ Garretson Ave., Sioux City, Iowa (Bronx, N. Y.)

RHODES, GROVER C., 1081 E. Broad St., Columbus, Ohio (Far Hills, N. J.)

RINDONE, GUY E., 610 W. Nittany Ave., State College, Pa. (Salem, Mass.)

SCHRECKENGOST, DON, 2617 St. Clair Ave., East Liverpool, Ohio (Alfred, N. Y.)

SUGDEN, JOHN A., "The Haven," Garson Lane, Wraysbury, Bucks, England (Worcestershire, England)

TROST, CONRAD, 334 Newbold Ave., Moorestown, N. J. (Pittsburgh, Pa.)

VAN ETTEN, CHARLES L., Harbison-Walker Refractories Co., Athens, Texas (Homestead, Pa.)

YOUNT, RICHARD V., Knox, Pa. (Cambridge, Mass.)

* Address in parentheses is former address.

OPPORTUNITY FOR VETERANS

An all-round potter is desired by the Electrotechnical Laboratory, U. S. Bureau of Mines, Norris, Tenn.

This permanent position is graded by the U. S. Civil Service Commission as SP-7 and has a basic annual pay rate of $2650, with 26 days of annual leave and 15 days of sick leave.

The Commission is temporarily accepting applications from veterans only. If, however, no veterans of either war apply, others will be used to fill the position.

Accurate mold making and jiggering are the most important qualifications. The work is not arduous, and skill and accuracy are more essential than speed. The person selected must be able to learn other phases of ceramics, including body making, glazing, colors, and firing.

The Electrotechnical Laboratory, now completing its war work, including special electrical porcelains for atomic bomb manufacture, is small and the staff has been selected for congenial cooperation. Living expenses in Norris are moderate.

Application blanks will be sent upon request.

INSTITUTE OF CERAMIC ENGINEERS

Executive Committee, 1945–1946

President: T. A. KLINEFELTER, Southern Experiment Station, U. S. Bureau of Mines, Tuscaloosa, Ala.
Vice-President: C. M. DODD, Iowa State College, Ames, Iowa.
Secretary: ROBERT TWELLS, Electric Auto-Lite Co., Spark Plug Div., Fostoria, Ohio.
Past-President: M. F. BEECHER, Norton Co., Worcester, Mass.
Trustee Representative: H. M. KRANER, Bethlehem Steel Co., Bethlehem, Pa.

ITEMS OF INTEREST TO CERAMIC ENGINEERS

Of interest to members of the Institute are the definitions of "professional engineer" and "practice of professional engineering" adopted at a conference of national engineering organizations held in New York, N. Y., August 28, 1945.

The conference was the result of the action of the Supreme Court of Illinois in declaring the Illinois registration law unconstitutional principally on the grounds that the definition of "professional engineer" used therein was not acceptable. As the definition was taken from the Model Law and therefore used in many other registration laws, the state boards of the country suggested that a conference be held to develop new definitions which would stand the test of the courts.

The following definitions were adopted:

"*Professional Engineer:* The term professional engineer, within the meaning and intent of this Act, shall mean a person who, by reason of his special knowledge of the mathematical and physical sciences and the principles and methods of engineering and design, acquired by professional education and practical experience, is qualified to practice engineering as hereinafter defined, as attested by his legal registration as a professional engineer.

"*Practice of Engineering:* The term practice of engineering, within the meaning and intent of this Act, shall mean any professional service or creative work requiring engineering education, training, and experience and the application of special knowledge of the mathematical, physical, and engineering sciences to such professional services or creative work as consultation, investigation, evaluation, planning, design, and supervision of construction for the purpose of assuring compliance with specifications and design, in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works, or projects.

"A person shall be construed to practice or offer to practice engineering, within the meaning and intent of this Act, who practices any branch of the profession of engineering; or who, by verbal claim, sign, advertisement, letterhead, card, or in any other way represents himself to be a professional engineer, or through the use of some other title implies that he is a professional engineer; or who holds himself out as able to perform, or who does perform, any engineering service or work or any other professional service designated by the practitioner or recognized by educational authorities as engineering."

The definitions will be submitted to the governing boards of the engineering societies for approval.

California is one of the three states which does not license all engineers in all branches. Only civil engineers are required to register under the present law and are therefore permitted to design and construct buildings and other engineering works. The Los Angeles Engineering Council of Founder Societies has prepared a proposed registration law to be presented to the next legislature. Under it licenses would be issued in the special branches in which the applicant could qualify, as in Ohio. Ceramic engineers were not included in the draft of the law distributed for criticism and suggestions and the omission has been called to the attention of the authors with the request that they be included.

In Illinois the revised act to regulate the practice of professional engineering was approved by the Governor July 20, 1945. This act takes the place of the one declared unconstitutional by the Illinois Supreme Court.

Excerpts from the Illinois law that will be of interest to ceramic engineers follow:

"SECTION 1. In order to safeguard life, health, and property, any person practicing or offering to practice professional engineering is required to submit evidence that he is qualified so to practice and to be registered as hereinafter provided. It is unlawful for any person not so registered to practice or offer to practice professional engineering in this State, or to use in connection with his name or otherwise assume, use, or advertise any title or description implying that he is a Registered Professional Engineer.

"SECTION 2. A person practices professional engineering, within the meaning of this Act, who plans or designs the physical parts of the following: railroads, railways, highways, subways, tunnels, canals, harbors, river improvements, docks and drydocks; levees, irrigation works; aircraft, air ports and landing fields; waterworks, sewers; sewage-disposal works; plants for the generation of power; engines or motors for the utilization of power; boilers; refrigeration plants; air-conditioning plants; heating plants; plants for the transmission or distribution of power; electrical plants which produce, transmit, distribute, or utilize electrical energy; works for the extraction of minerals from the earth; plants for the refining, alloying, or treating of metal; chemical works and industrial plants involving the use of chemicals and chemical processes.

"SECTION 9. A person is qualified to receive a certificate of registration who is of good moral character and temperate habits, and (1) successfully passes a written, or written and oral, examination designed to show knowledge and skill equivalent to that attained through graduation from an engineering college; and has had eight years or more of experience in professional engineering; or (2) has graduated from an engineering college and has had four years or more of experience in professional engineering.

"SECTION 12-2. Examinations of applicants who seek to practice professional engineering shall embrace the subjects required of candidates for a baccalaureate degree in engineering by the College of Engineering of the University of Illinois, and shall be such as will establish whether or not the applicant has the professional engineering experience required by Section 9."

Ceramic engineers are covered in Section 2 under "works for the extraction of minerals from the earth" and "industrial plants involving the use of chemicals and chemical processes."

—A. F. GREAVES-WALKER, *Chairman, Committee on State Boards of Engineering Examiners*

MIDWEST RESEARCH INSTITUTE ANNOUNCES STAFF ADDITIONS

The Midwest Research Institute, Kansas City, Mo., has announced the addition of eight new members to its technical staff, which brings the total personnel of the Institute to seventy-one.

PERSONAL NOTES

FERRO ENAMEL EXECUTIVE RETURNS

After a five-year leave of absence, during which time he was with the Canadian Army in the capacity of deputy master general of the Ordnance, Brigadier Wilfrid Mavor has again taken up his duties as vice-president in charge of foreign activities and a director of the Ferro Enamel Corporation.

Brigadier Wilfrid Mavor

Brigadier Mavor was born in Glasgow, Scotland, and migrated to Canada as a small boy. A graduate of the Royal Military College, Kingston, Ontario, he enlisted in World War I in 1914 as a lieutenant in the 48th Highlanders of Toronto, Canada, and rose to the rank of major. He was wounded four times, mentioned in dispatches three times, and awarded the Military Cross. He later saw active service with a British Whippet Tank Unit and at the close of hostilities in 1918 was in command of a tank company in Canada's First Tank Battalion.

In World War II, he left active business in 1940 to become an instructor at the Canadian Armoured Vehicle Training Centre with the rank of major. Later he was appointed to the British Tank Mission in Washington with the rank of lieutenant colonel and returned to Canada with the rank of colonel. He was subsequently appointed deputy master general of the Ordnance (B) with the rank of brigadier. He made several trips to England and France and returns to Ferro with a background of world travel extending over many years before the war.

Brigadier Mavor is also president of Ferro Enamels (Canada), Ltd., Ottawa, Ont., Canada, the largest and oldest foreign subsidiary of the Ferro Enamel Corporation.

Robert A. Weaver, president of the Ferro Enamel Corporation, in announcing the return of Brigadier Mavor, states that the company has extensive plans for the development of foreign subsidiaries.

At present, subsidiary plants are operated in Canada, England, Holland, France, Brazil, Argentina, and Australia. These plants, duplicating the output and services of the Cleveland plant, manufacture finishes for metal and clayware products and also design and build complete plants for the application of these finishes.

The company has found the policy of operating foreign plants sound and, consequently, is contemplating the addition of new plants in other countries as soon as possible. The foreign plants, with the exception of those in Holland and France, operated at high levels during World War II, and all performed at satisfactory levels throughout the depression of the thirties. The Dutch and French plants, however, suffered no damage to buildings or equipment.

At Cleveland, Brigadier Mavor will have headquarters in the recently expanded International Division offices of the Ferro Enamel Corporation, which are located in the Union Commerce Building.

Brigadier Mavor has been a member of The American Ceramic Society since 1925.

W. J. REES ELECTED PRESIDENT OF BRITISH CERAMIC SOCIETY

Walter James Rees has been elected president of The British Ceramic Society.

Walter James Rees

Dr. Rees is vice-president of the National Association of Clayworks' Managers and a past president of the Refractories Association of Great Britain, of which he is still secretary. Some time ago, he was awarded the O.B.E. (Officer (of the Order) of the British Empire) in recognition of his valuable work as technical adviser to Foundry Bonding Materials Control.

Dr. Rees has been head of the Refractories Department of Sheffield University since 1917 and his election to the presidency of The British Ceramic Society takes place on the eve of his retirement from the Department.

A biographical sketch of Dr. Rees was published in the September, 1938, *Bulletin*, p. 379.

J. M. LEPP JOINS BATTELLE STAFF

Jack Martin Lepp has been named to the research staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its Division of Ceramic Research.

Mr. Lepp, formerly with the Laclede-Christy Clay Products Co., St. Louis, Mo., is a graduate of the University of Illinois.

Jack Martin Lepp

P. B. SLAWTER WITH ADVERTISING COMPANY

Paul B. Slawter, Jr., has been appointed copy chief and account executive for The House of J. Hayden Twiss, Advertising, New York, N. Y. His appointment was effective October 15.

Mr. Slawter attended the New York State College of Ceramics, Alfred, N. Y., and New York University, New York, N. Y. He is a member of the Chemists' Club and the Salesmen's Association of the American Chemical Industry.

JOHN E. MARQUIS ON PEMCO STAFF

John E. Marquis has been a member of the Ceramic Laboratory staff of the Pemco Corp., Baltimore, Md., since October 1, 1945.

Mr. Marquis was graduated from The Ohio State University, Columbus, Ohio, with a B.A. *cum laudh* in 1941. A year later, he was appointed research associate for the American Nepheline Corporation and the United States Potters Association at the Engineering Experiment Station. In 1943, Mr. Marquis obtained graduate credit in ceramic engineering at The Ohio State University. His work on and development of leadless glazes during wartime has received national recognition.

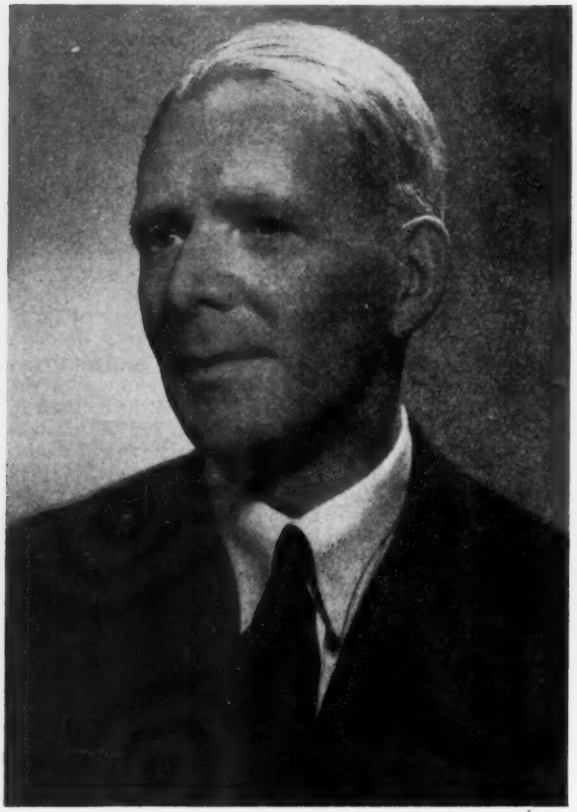
A member of The American Ceramic Society since 1943, Mr. Marquis had been active in the Central Ohio Section, having served as secretary-treasurer of this group from December, 1944, until his departure for Baltimore.

HARRY W. WEBB HONORED

Harry W. Webb, principal of the North Staffordshire Technical College, Stoke-on-Trent, England, and director of the Ceramic Testing Laboratory, has been awarded the O.B.E. (Officer (of the Order) of the British Empire).

Born in Boston, Mass., September 29, 1893, Dr. Webb was educated at the University of Birmingham, graduating with first class honors in chemistry in 1913. A Priestley Research Scholar, he counts among his many awards the Heslop Gold Medal for Research and the 1851 Research Exhibition. He received his M.Sc. degree in 1914 and was awarded the D.Sc. degree in 1931.

From 1919 to 1928, Dr. Webb was head of the Department of Industrial Chemistry at the Technical College, Cardiff, South Wales, where he did a good deal of work on fuel problems. Returning to Birmingham, he spent three years as principal of the Aston Technical College.



Harry W. Webb

In 1931, he was transferred to the Pottery School of the North Staffordshire Technical College, where he worked with the late J. W. Mellor. In 1934, he became head of the Pottery Department, succeeding Dr. Mellor, who was also the first principal of the College.

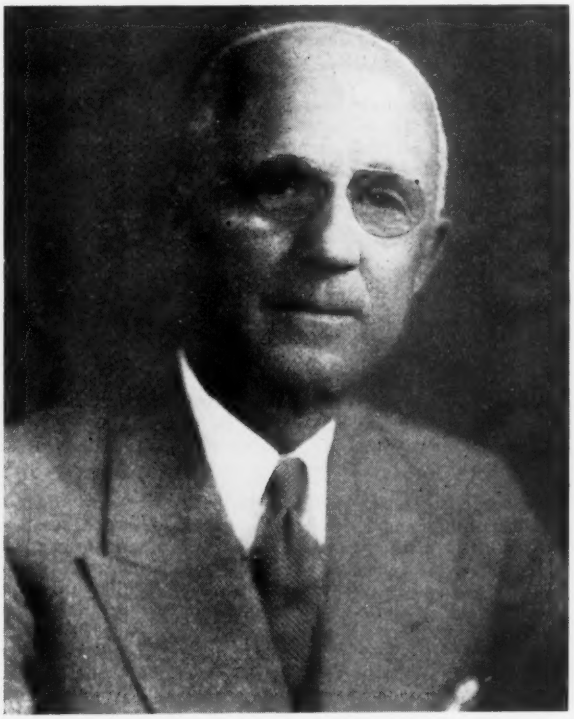
During the war, Dr. Webb designed a national scheme of apprenticeship and training which has been officially accepted by employers and operatives in the pottery industry. He also assisted the Ministry of Labour and the pottery industry in drafting schemes for the training of disabled and demobilized service personnel for entry into the pottery, building, and iron-foundry industries. He is at present engaged in laying out a pottery factory for apprenticeship training. His other war work was concerned with research on explosives.

Dr. Webb is a Fellow of the Royal Institute of Chemistry, a Fellow of the Royal Society of Arts, and a member of the Institution of Chemical Engineers.

DIVISION OF CLAY AND SILICATE PRODUCTS NATIONAL BUREAU OF STANDARDS

Phaon H. Bates, chief of the Division of Clay and Silicate Products, National Bureau of Standards, Washington, D. C., and a member of the Bureau's staff since 1910, retired from Government service September 15, 1945.

A biographical sketch of Mr. Bates, a Charter Fellow of The American Ceramic Society and a member of the Board of Trustees of the Edward Orton, Jr., Ceramic Foundation, was published in the October, 1942, *Bulletin*, pp. 227–28.



Phaon H. Bates

SUCCEEDED BY DOUGLAS E. PARSONS

Douglas E. Parsons, a member of the staff of the National Bureau of Standards for more than twenty years, has been named chief of the Division of Clay and Silicate Products to succeed Mr. Bates. A civil engineer, Mr. Parsons has been associated with the Bureau's Section on Masonry Construction.

A native of Iowa, born in Marion, November 3, 1894, Mr. Parsons completed his education in his home state, graduating in 1917 with the A.B. degree and receiving the C.E. degree in 1923, both from Cornell College, Mount Vernon, Iowa. In the United States Army from 1917 to 1919, he served as a lieutenant with the 89th Division, American Expeditionary Forces. Upon his return to civilian life, he became assistant chief engineer of the Iowa Railway and Light Co., Cedar Rapids, Iowa.

In 1923, he joined the staff of the National Bureau of Standards, was placed in charge of the Masonry Construction Section in 1929, and early in 1944 was designated assistant chief of the Division which he now heads; his entire service with the Bureau has been in that Division.

Following many years of active participation in the affairs of the American Concrete Institute, Mr. Parsons was elected its president in February, 1945, for a one-year term. In 1936, he was awarded the Institute's Wason Medal in recognition of noteworthy research; he shared this honor jointly with Ambrose H. Stang of the National Bureau of Standards and Vice-Admiral Ben Moreell, U. S. Navy, Bureau of Yards and Docks, for work involved in studies of Mesnager hinges, used in concrete constructions.

He is a member of The American Ceramic Society, the American Society of Civil Engineers, the American Society for Testing Materials, the American Association for the Advancement of Science, the Society for Experimental Stress Analysis, and the Washington Academy of Sciences; and is chairman of American Standards Association Committee A-41 on Masonry and the Federal Specifications Technical Committee on Precast Reinforced Concrete Products. Mr. Parsons is author or co-author of a large number of papers in the Bureau's series of publications, including more than a dozen of the Building Materials and Structures Reports on structural properties of various types of masonry construction.

Douglas E. Parsons

ROBERT F. SHERWOOD ELECTED PRESIDENT OF UNITED FELDSPAR & MINERALS CORPORATION

Robert F. Sherwood has been elected president of the United Feldspar & Minerals Corp., New York, N. Y. He succeeds Francis E. Haag, who died September 30 (see p. 442).

Robert Ford Sherwood

Biography

Robert Ford Sherwood was born in Hornell, N. Y., April 4, 1897, and was graduated from the Hornell High School in 1915. After attending the New York State College of Ceramics, Alfred, N. Y., for three years, he left school to become ceramic assistant at the National Bureau of Standards, Washington, D. C. In April, 1920, he went back to Alfred to receive his B.S. degree in ceramic engineering two months later.

Immediately after graduation, he returned to the National Bureau of Standards, where he remained until November, 1921. From then until 1935, he was associated successively as ceramic engineer with the Muncie Clay Products Co., Muncie, Ind. (November, 1921, to August, 1922), Pass & Seymour, Inc., Syracuse, N. Y. (September, 1922, to December, 1930), Smith & Stone, Ltd., Georgetown, Ontario, Canada (January, 1931, to September, 1934), and the Sherwood Porcelain Co., Ltd., Hamilton, Ontario (November, 1934, to November, 1935).

In 1935, Mr. Sherwood joined the staff of the United Feldspar & Minerals Corporation as sales executive, and, before his election to the presidency, had been serving as executive vice-president of the Corporation.

He was granted the professional degree of ceramic engineer at the New York State College of Ceramics in 1939.

Society Activities

Mr. Sherwood has been a member of The American Ceramic Society since 1919. He has been active in the White Wares Division, having served as secretary of the Division (1926–1929), chairman (1929–1930), chairman of the Rules Committee (1937–1939), and chairman of the Membership Committee (1941–1942).

He has also served as a member of the Publications Committee of The Society (1936–1938).

Mr. Sherwood is a Fellow of The American Ceramic Society and a member of the Institute of Ceramic Engineers. He is also a member of Keramos, the Ceramic Association of New Jersey, the Ceramic Association of New York, and the Canadian Ceramic Society.

Publications

(1) "Rate of Vitrification of Porcelain Molded under Different Conditions," *Jour. Amer. Ceram. Soc.*, **3** [10] 837–41 (1920).

(2) "Manufacture of Electrical Porcelain at the Plant of Pass & Seymour," *The Ceramist*, **5**, 74–91 (1924).

(3) "Medieval European Pottery," *Bull. Amer. Ceram. Soc.*, **4** [5] 211–18 (1925).

(4) "Method for Determining Life of a Sagger," *ibid.*, [7] 323–26.

(5) (With Edward Schramm) "Some Properties of Glaze Slips," *Jour. Amer. Ceram. Soc.*, **12** [4] 270–73 (1929).

HOWELLS FRÉCHETTE RETIRES

Howells Fréchette, chief of the Division of Industrial Minerals, Bureau of Mines, Ottawa, Ontario, Canada, retired August 13, 1945, after thirty-seven years of Government service.

To honor him upon his retirement, members of the Division of Industrial Minerals, heads of other Divisions, and friends held a farewell dinner for him in Ottawa on August 13. Among those present were G. M. Hutt and R. Dawson, Montreal; Norman Davis, Ottawa; and Van Derck Fréchette and J. F. McMahon, Alfred, N. Y. Mrs. Fréchette was a special guest and was presented with a floral corsage.

Charles Camsell, deputy minister of the Department, reviewed the work of Mr. Fréchette during his long period of service, making special reference to his work in the ceramic field. Hugh Spence made the presentation of a combination record player and radio which was a present from Mr. Fréchette's co-workers.

Although Mr. Fréchette has retired from active duty, he undoubtedly will maintain his great interest in the ceramic industry and will continue to give it his able assistance.

Biography

William Cooper Howells Fréchette was born August 13, 1879, in the United States Consulate in Toronto, Ontario, Canada, where his grandfather, the Honorable W. C. Howells, was Consul. His parents were Achille and Annie (Howells) Fréchette of Ottawa, Canada.

He was graduated from McGill University, Montreal, in 1901 with the degree of B.Sc. in mining and metallurgical engineering and received the degree of M.Sc. in 1903 for research work conducted while acting as an instructor at McGill.

From 1903 to 1904, he was chemist for the Londonderry Iron and Mining Co., Ltd., Londonderry, Nova Scotia. From 1904 to 1908, he was employed as mining engineer by the Crow's Nest Pass Coal Co., Ltd., Fernie, British Columbia.

In 1908, he was appointed to the Mines Branch of the Canadian Department of Mines at Ottawa, where he organized and took charge of the Nonmetalliferous Mines Division. He made an extensive study of the minerals used by manufacturers throughout Canada and later specialized on the limestone group and mineral pigments.

In 1923, upon the retirement of the late Joseph Keele,

Howells Fréchette

who was well known for his investigation of the clay resources of Canada, Mr. Fréchette was placed in charge of the Ceramics and Road Materials Division of the Mines Branch and instituted studies of the problems of the Canadian ceramic industries. With the reorganization of the Department as the Department of Mines and Resources in 1936, his Division was enlarged by the addition of all investigational work on the nonmetallic minerals and was renamed the Industrial Minerals Division.

Mr. Fréchette married Lena Derick of Ottawa in 1914. They have two sons, Van Derck Fréchette of the New York State College of Ceramics, Alfred, N. Y., and Lieut. Col. William D. H. Fréchette, Royal Canadian Ordnance Corps, who is on duty with the British Army of the Rhine.

Memberships

Mr. Fréchette is a member of the Canadian Ceramic Society (past vice-president and president), the Canadian Institute of Mining and Metallurgy, the American Institute of Mining and Metallurgical Engineers, the American Society for Testing Materials, and the Canadian Standards Association.

He has been a member of The American Ceramic Society since 1923. He has served as Secretary and Chairman of the Structural Clay Products Division and on several committees. He served as Associate Dean of The Fellows of The American Ceramic Society from 1943 until the discontinuance of this group early in 1945.

Honors

In recognition of his Departmental work, Mr. Fréchette was awarded the Jubilee Medal in 1935 and in 1936 received the Coronation Medal of King George VI.

Publications

Mr. Fréchette is the author of numerous Government reports and occasional papers published in the transactions of technical societies and trade journals.

C. J. UHRMANN ON EUROPEAN MISSION

C. J. Uhrmann, vice-president and plant manager of the Imperial Glass Corp., Bellaire, Ohio, was designated recently by the Chemicals Unit, Operations Division of the Foreign Economic Administration in Washington as a member of the Technical Industrial Intelligence Committee to visit Great Britain and Western Europe as a technical observer and scientific consultant for the Joint Intelligence Objectives Agency under the Joint Chiefs of Staff.

Carl J. Uhrmann

Mr. Uhrmann left the United States early in November with other members of this Committee and will visit all existing glass manufacturing operations in the scheduled countries in the interests of securing glass manufacturing and techniques information of value to the United States.

Mr. Uhrmann has been given a leave of absence by his company for the necessary period to complete this mission.

Biography

Carl John Uhrmann was born May 11, 1900, in Vienna, Austria. He received his elementary education in Vienna and attended high school in Prague, Teplitz, and Reichenberg, Czechoslovakia. He went on to college in Prague and Vienna and was graduated in chemistry and ceramic engineering.

Mr. Uhrmann was first employed in Europe by Joseph Inwald A. G., a glassware manufacturing company, as plant chemist and later as assistant superintendent at the plants in Prague and Teplitz.

He left the employ of Joseph Inwald and arrived in New York in December, 1925, where he worked as import correspondent for the Berthold Lechner Company and later

as consultant on glass design problems for William R. Noe & Company.

In February, 1927, he went to Chicago, Ill., to become plant superintendent for the Inland Glass Works, Inc., and in 1933 he became plant manager of the Peltier Glass Co., Ottawa, Ill.

He has been associated with the Imperial Glass Corporation since 1936.

Mr. Uhrmann, now an American citizen, has been a member of The American Ceramic Society since 1927. He is the Glass Division representative on The Society Committee on Industrial Management, having served in this capacity since 1943. He is also a member of the Tariff Committee of the American Glassware Association and a member of the National Association of Manufacturers of Pressed and Blown Glassware.

SERGEANT WOODALL RELEASED FROM ARMY

Friends of Staff Sergeant Edward L. Woodall, Jr., will be glad to learn that he has been released from the Army and is now at his home in Smithfield, N. C.

Sergeant Woodall returned to this country shortly after the war ended in Germany and until his release was in Towers Hospital, Miami Beach, Fla., recuperating from injuries received when his plane was forced down over Hamburg, Germany, December 31, 1944 (see the April, 1945, *Bulletin*, p. 154). He was taken prisoner at that time and remained in a German camp hospital for about six months.

Sergeant Woodall was on more than a score of missions on a B-17 Flying Fortress known as the "Nine Lives" and holds the Air Medal with two Oak Leaf Clusters.

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CERAMIC TECHNOLOGIST AVAILABLE

Owing to conditions in Greece, L. Poulieso, a Russian chemical engineer specializing in ceramics, is being compelled to seek work elsewhere.

A Greek subject since 1938, Mr. Poulieso has had many years of experience as managing director of ceramic factories in Russia and Greece and has a solid knowledge of the production of faience and rough ceramics.

He is the author of more than twenty scientific papers published in Russian and German and has a good knowledge of the English language.

All those wishing to contact Mr. Poulieso may write to him at the following address: 92, Mavromihali St., Athens, Greece.

Reading *The Journal* in a Russian library.

RUSSIANS NEED HELP IN RESTOCKING LOOTED LIBRARIES

In the library of a factory in the Soviet Union, Russian workers read *The Journal of The American Ceramic Society*. These Russians and millions more understand and enjoy reading books by American and British authors, but they are finding it extremely difficult today to find these books in Soviet libraries since millions of volumes were destroyed during the German occupation. To help restock the looted shelves with books by American and British authors, Russian Relief is conducting a campaign to collect one million books for prompt shipment to the Soviet Union. Heading the committee is Bennett Cerf, noted publisher and author, who has asked for good hard-backed editions of technical books published since 1927 and for famous American and British classics by Walt Whitman, Mark Twain, John Steinbeck, John Hersey, Charles Dickens, William Shakespeare, and others. Contributions should be sent to your nearest Russian Relief office or to the Russian Relief Workroom, 35 West 35th St., New York, N. Y.

ST. LOUIS SECTION

The next regular meeting of the St. Louis Section will be held December 5, 1945. It is hoped that any out-of-town members of The Society who are in St. Louis will take advantage of an opportunity of renewing old acquaintanceships and hearing a good program. Get in touch with one of the members so that reservations may be made.

Désirée S. le Beau, director of research at the Midwest Rubber Reclaiming Co., East St. Louis, will talk on "Some Fundamental Concepts of the Colloid Structure of Clays and Their Influence on the Practical Use of the Raw Material." Dr. le Beau is merely on leave from her research work at M.I.T. and was formerly associated with the Dewey and Almy Chemical Company at Cambridge and the Austro-American Rubber Works Company in Vienna. The Section is fortunate in being able to present such an authority in her field.

NECROLOGY

ROGER JOSEPH HOUZE*

Roger Joseph Houze

Roger Joseph Houze, president of the L. J. Houze Convex Glass Co., Point Marion, Pa., died suddenly Friday, September 14, 1945, at Bryn Mawr Hospital, Bryn Mawr, Pa. Mr. Houze, with his family, was passing through Bryn Mawr en route to Atlantic City for a vacation when taken suddenly ill and died within a few minutes.

Roger Joseph Houze was the son of Leon J. Houze, Sr., and Irma (Andris) Houze. He was born at Fostoria, Ohio, December 23, 1890. About the turn of the century his father, one of the outstanding pioneers in American glass manufacture,† took his family to Point Marion, Pa., to engage in the manufacture of window glass. Here Roger Joseph Houze completed his preliminary education in the Point Marion schools, following which he studied at Eastern College, Front Royal, Va.; Duquesne University, Pittsburgh, Pa.; and Notre Dame University, South Bend, Ind. Upon the completion of his education he entered the glass plants of the Houze companies, where he served a thorough apprenticeship in all phases of glass manufacture under the capable guidance of his father. At the age of twenty he became a partner of his father in the manufacture of convex glass and glass specialties. When the Houze companies were merged into the present L. J. Houze Convex Glass Company in 1923, Roger Joseph Houze assumed the duties of secretary and treasurer, in which capacity he served until the death of his father in 1940, when he became president of the Company.

As president of the L. J. Houze Convex Glass Company, Roger continued the distinguished record which has marked the association of this family with the American glass industry for many years. Building on the notable achievements of his father, Leon J. Houze, Sr., founder of the Houze companies, he was largely responsible for their development and for the fame which has come to Point Marion as one of the major centers of fine glass manufacture in the United States.

In order to produce the wide variety of special glass desired, the Houze Company found it necessary to build a very large number of single pot furnaces. By doing so, more exacting requirements could be met and a better grade of glass both as to quality and color could be produced.

Nature was kind to Roger Joseph Houze, as she blessed him with a personality that was the envy of all who knew him. Very few men exemplified a kindlier or more cooperative disposition. His policy was that if he could ever help anyone, it was his pleasure and not that of the recipient. Not only his family and those associated with the L. J. Houze Convex Glass Company are going to miss him, but everyone who had the pleasure of his acquaintanceship has suffered a severe loss through his passing. He will long be kindly remembered.

Aside from his many duties in his business, Mr. Houze was very active in civic and fraternal work. He was a member of all Masonic bodies, both Scottish and York Rites and of Syria Temple, Ancient Arabic Order Nobles of the Mystic Shrine of Pittsburgh, Pa.; Morgantown, West Va., Lodge No. 411, Benevolent and Protective Order of Elks; Point Marion Aerie No. 1932, Fraternal Order of Eagles; the Point Marion Rotary Club; the Pittsburgh Chamber of Commerce; the Uniontown Chamber of Commerce; the Uniontown Country Club; the Uniontown Motor Club; and the Syria Temple Automobile Club. He was vice-president and a director of the First National Bank of Point Marion; a director of the Point Marion Bridge Company; the Point Marion School Association; and the Evergreen Memorial Cemetery. He served four years on Fayette County Selective Service Board No. 8 and was Point Marion District Chairman of the Committee for Economic Development.

At the time of his death, Mr. Houze was Corporation representative in The American Ceramic Society for the L. J. Houze Convex Glass Company.

* From *Nat. Glass Budget*, **61** [22] 3, 8 (Sept. 29, 1945).
† See *Bull. Amer. Ceram. Soc.*, **19** [3] 104–105 (1940).

LIEUTENANT RAYMOND L. CHRISTIAN, JR.

Second Lieutenant Raymond L. Christian, Jr., a Student Member of The American Ceramic Society since 1942, was killed in action in Germany in December, 1943.

Before entering the service, Lieutenant Christian had attended the Georgia School of Technology, Atlanta, Ga.

LIEUTENANT JOSEPH A. CONARD

Lieutenant Joseph A. Conard was killed in action in France January 13, 1945.

Before entering the service, Lieutenant Conard had been a student at the University of Illinois, Urbana, Ill., and would have been graduated in 1943.

FRANCIS EDGAR HAAG

Francis Edgar Haag, president of the United Feldspar & Minerals Corp., New York, N. Y., died suddenly from a heart attack September 30, 1945, at his home in Pelham, N. Y. He was seventy years old. Although Mr. Haag had been in poor health since early in February, his death came very suddenly.

Mr. Haag was the first president of the United Feldspar & Minerals Corporation, which was organized in 1929; associated with him in the business was the late Charles H. Peddrick, vice-president of the Corporation.

Born March 4, 1875, Mr. Haag was reared in Mount Vernon, N. Y., and attended the Mount Vernon schools. He became associated with the Westchester Lighting Company and was later associated with H. D. Wallbridge & Company, a utility holding company now dissolved. He was a former director of the Pelham National Bank. During the First World War, Mr. Haag received a commission in the Army as major and had charge of all of the accounting work for the Aircraft Division of the Army Air Corps.

Mr. Haag is survived by his widow, Mrs. Winifred L. Haag; two sons, Capt. Francis E. Haag, Jr., of the Army Air Forces, and Hubert V. D. Haag; and two daughters, Mrs. John V. McFarland and Miss Catherine Haag.

Mr. Haag had been a member of The American Ceramic Society since 1942.

KANSAS CITY MERCHANDISE MART

A Merchandise Mart has been opened in Kansas City, Mo. The Mart will offer central buying service to manufacturers and wholesalers and their representatives, agents, and brokers in soft lines of all kinds, home furnishings, houseware, and appliances.

Homer E. Anderson is managing director.

NONELECTRIC STAINLESS STEEL MAGNET

The successful development of a powerful, compact, nonelectric magnetic separator with a working surface made entirely of stainless steel has been announced by the Eriez Manufacturing Co., Erie, Pa., one of the pioneers in the permanent magnet field.

This announcement is of particular interest to the ceramic industry, as the magnet offers a simple and efficient means of removing both ferrous particles and small pieces of iron and steel trash present in materials used in the manufacture of ceramics. Installed at any point where raw ceramic materials enter a chute or conveyer, the magnetic separator will attract and hold magnetic foreign bodies, preventing them from falling into expensive pulverizing or reducing machinery where they will cause damage.

CLAY IN 1944

According to reports of producers to the U. S. Bureau of Mines, approximately 40% of the 17,295,328 tons of clay sold or used in 1944 was consumed in heavy clay products, 31 in refractories, 16 in Portland cement, 3 in paper, and 2 in pottery. The remainder entered a wide variety of uses.

DIRECT WORD FROM EUROPE*

We are not getting many journals out of Europe right now. Publication is at a low ebb and communication is still much restricted. *Chemical Abstracts* managed to publish abstracts of European papers more effectively during wartime than we are doing right now, strange as that may seem, but this is largely to be attributed to changed conditions to which adjustment is necessary.

What are the conditions over there as they relate to chemistry and chemical literature? Several recent letters from Europe have reached your editor and perhaps a few excerpts from them will be of interest to you. Here they are:

"There will be no publications coming from there [Germany] for quite a time to come because nothing is printed but the few weekly newspapers and Government informations."

"The library of the Deutsche Chemische Gesellschaft has disappeared. The printing center of Leipzig is largely destroyed."

"There is no mail, no communication at all between the different German zones, and all research has been suspended with universities closed."

"Though the war with arms is over, the war on paper goes on and as you know the pen is mightier than the sword."

"Half of the universities and Techn. Hochschulen are ruined."

"Even if we weaken towards a beaten enemy, the Russians won't have any qualms of conscience, and they, after all, occupy more than half of the Reich."

"There is a lot of material in Europe waiting to be written up and abstracted, and some of it is of decided interest to American chemists."

"One of the most disturbing things that I discovered was the fact that some 15 or more various intelligence groups all rushed in to Germany and each one of these groups took scientific documents and brought them back either to London or Paris. There is absolutely no evidence of any coordination on this matter. We stand to lose the only thing that we could get out of the war, namely, information on the scientific advances made in Germany."

"I came across one story where some 15 different intelligence groups had been into one of the I.G. plants. The last few of the intelligence groups to question the German scientists were quite shocked to be told that the Germans had prepared a mimeographed summary of all of the information they had available—that this had been done because so many different groups were asking the same questions."

"French, Belgian, and Dutch periodicals have generally managed to survive. Agents for American libraries in these countries have as a general rule managed to save and to store away safely sufficient copies to meet prewar demands."

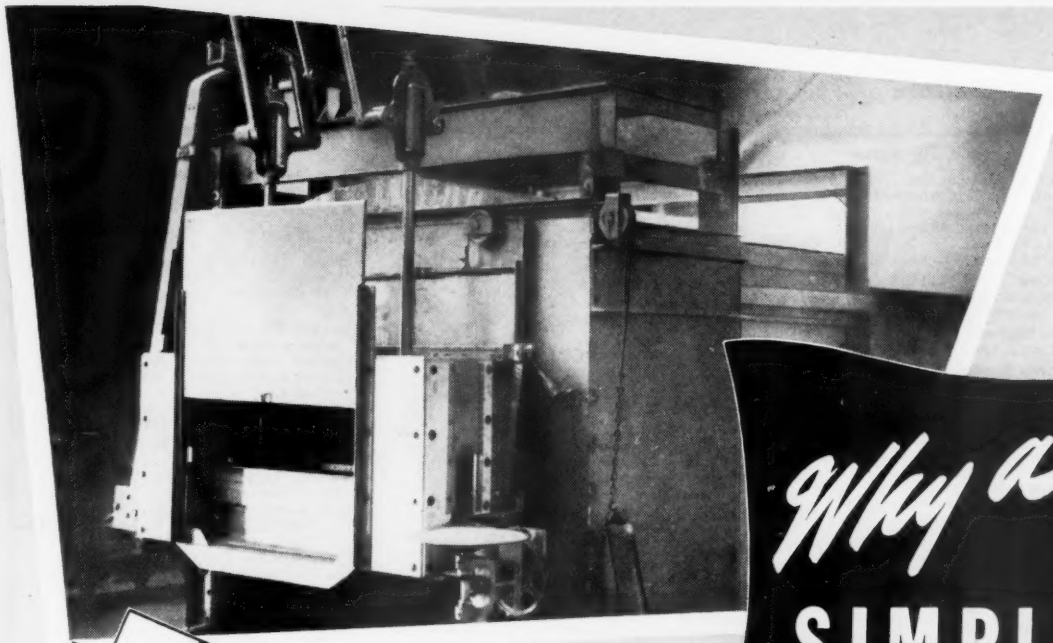
"It should be noted that the quality of paper used in the Belgian and Dutch periodicals has stood up reasonably well, whereas the quality of paper in the French journals is infinitely worse than the already poor quality in use before 1939."

"The Leipzig blitz of December, 1943, destroyed part of the journals stored for American libraries."

"As for the publishing activities in Germany, it is known that drastic orders were given in October, 1944, and again in March of 1945 sharply curtailing nearly all publishing and merging all journals of a similar nature. For example, in the field of medicine the following journals were amalgamated: *Deut. med. Wochschr., Munch. med. Wochschr., Wien. med. Wochschr., Klin. Wochschr., Med. Welt.*"

Such accumulated periodicals as have come through from Europe since V-E Day show on checking that our wartime efforts to cover European chemical literature were rather fruitful.

* Reprinted from *The Little C.A.* (a bulletin published for *Chemical Abstracts* workers), No. 47, August 18, 1945.



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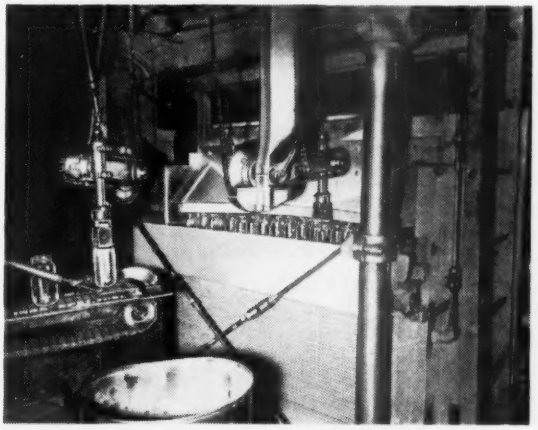

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Drakenfeld, B. F., & Co., Inc.
Harshaw Chemical Co.
Hommel, O., Co., Inc.
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Stauffer Chemical Co.
Vitro Mfg. Co.

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Vitro Mfg. Co.

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Ferro Enamel Corp.
Harshaw Chemical Co.
Hommel, O., Co., Inc.

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Harshaw Chemical Co.
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Clay (Enamel)
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Hammill & Gillespie, Inc.
Harshaw Chemical Co.
Hommel, O., Co., Inc.
Kentucky Clay Mining Corp.
Maxson, Elwyn L.
Metal & Thermit Corp.
Pemco Corp.
Spinks, H. C., Clay Co.
Titanium Alloy Mfg. Co.
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Clay (Fire)
Great Lakes Foundry Sand Co.
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Clay Miners
Great Lakes Foundry Sand Co.
Kentucky Clay Mining Co.
Maxson, Elwyn L.
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Hommel, O., Co., Inc.
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Hommel, O., Co., Inc.
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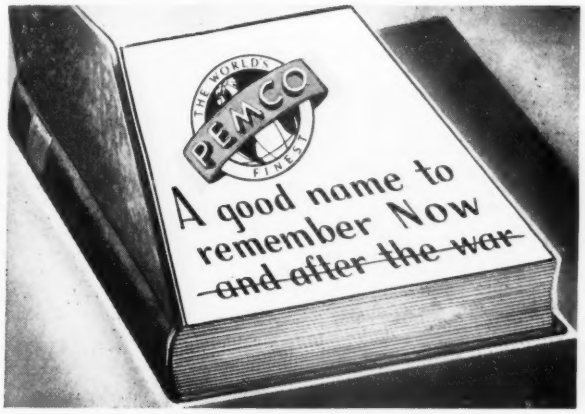

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Hommel, O., Co., Inc.
Industrial Ceramic Products, Inc.
Potters Supply Co.

Strontium Carbonate
Barium Reduction Corp.
Pennsylvania Salt Mfg. Co.

Sulfur
Hommel, O., Co., Inc.
Stauffer Chemical Co.

Sulfuric Acid
Harshaw Chemical Co.
Hommel, O., Co., Inc.
Pennsylvania Salt Mfg. Co.
Stauffer Chemical Co.

Talcs
Clinchfield Sand & Feldspar Corp.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
Hommel, O., Co., Inc.
Innis, Speiden & Co.

Tanks
Frazier-Simplex, Inc.

Tank Blocks
Corhart Refractories Co.

Tanks for Raw Material Steel or Concrete
Lancaster Iron Works, Inc.

Testing
Micromeritic Co.

Thimbles—Decorating
Potters Supply Co.

Tile (Floor)
Carborundum Co.
Norton Co.

Tile (Refractory)
Carborundum Co. (*Carbofrax*)
Electro Refractories & Alloys Corp.
Norton Co.
Remmey, Richard C., Son Co.

Tin Oxide
Drakenfeld, B. F., & Co., Inc.
Du Pont de Nemours, E. I., & Co., Inc., Electrochemicals Dept.
Hommel, O., Co., Inc.
Metal & Thermit Corp.
Vitro Mfg. Co.

Titanium Oxide
Drakenfeld, B. F., & Co., Inc.
Du Pont de Nemours, E. I., & Co., Inc.
Foote Mineral Co.
Harshaw Chemical Co.
Hommel, O., Co., Inc.
Metal & Thermit Corp.
Orefraction, Inc.
Titanium Alloy Mfg. Co.
Vitro Mfg. Co.

Trisodium Phosphate
Harshaw Chemical Co.
Hommel, O., Co., Inc.

Trucks
Lancaster Iron Works, Inc.

Tubes (Insulating)
Carborundum Co.
McDanel Refractory Porcelain Co.
Norton Co.

Tubes (Pyrometer)
Carborundum Co.
Electro Refractories & Alloys Corp.
Leeds & Northrup Co.
Maxson, Elwyn L.
McDanel Refractory Porcelain Co.
Montgomery Porcelain Products Co.
Norton Co.

Ultrox
Metal & Thermit Corp.

Uranium Oxide
Drakenfeld, B. F., & Co., Inc.
Ferro Enamel Corp.
Harshaw Chemical Co.
Hommel, O., Co., Inc.
Vitro Mfg. Co.

Uverite
Harshaw Chemical Co.

Vitreosil
Thermal Syndicate, Ltd.

Water Softening Plants
Frazier-Simplex, Inc.

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Innis, Speiden & Co.

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Clipper Mfg. Co.

Whiting
Drakenfeld, B. F., & Co., Inc.
Du Pont de Nemours, E. I., & Co., Inc.
Hammill & Gillespie, Inc.
Harshaw Chemical Co.
Hommel, O., Co., Inc.
Potters Supply Co.
Vitro Mfg. Co.

Winding Drums
Lancaster Iron Works, Inc.

Zinc Oxide
Du Pont de Nemours, E. I., & Co., Inc.
Harshaw Chemical Co.
Hommel, O., Co., Inc.
Vitro Mfg. Co.

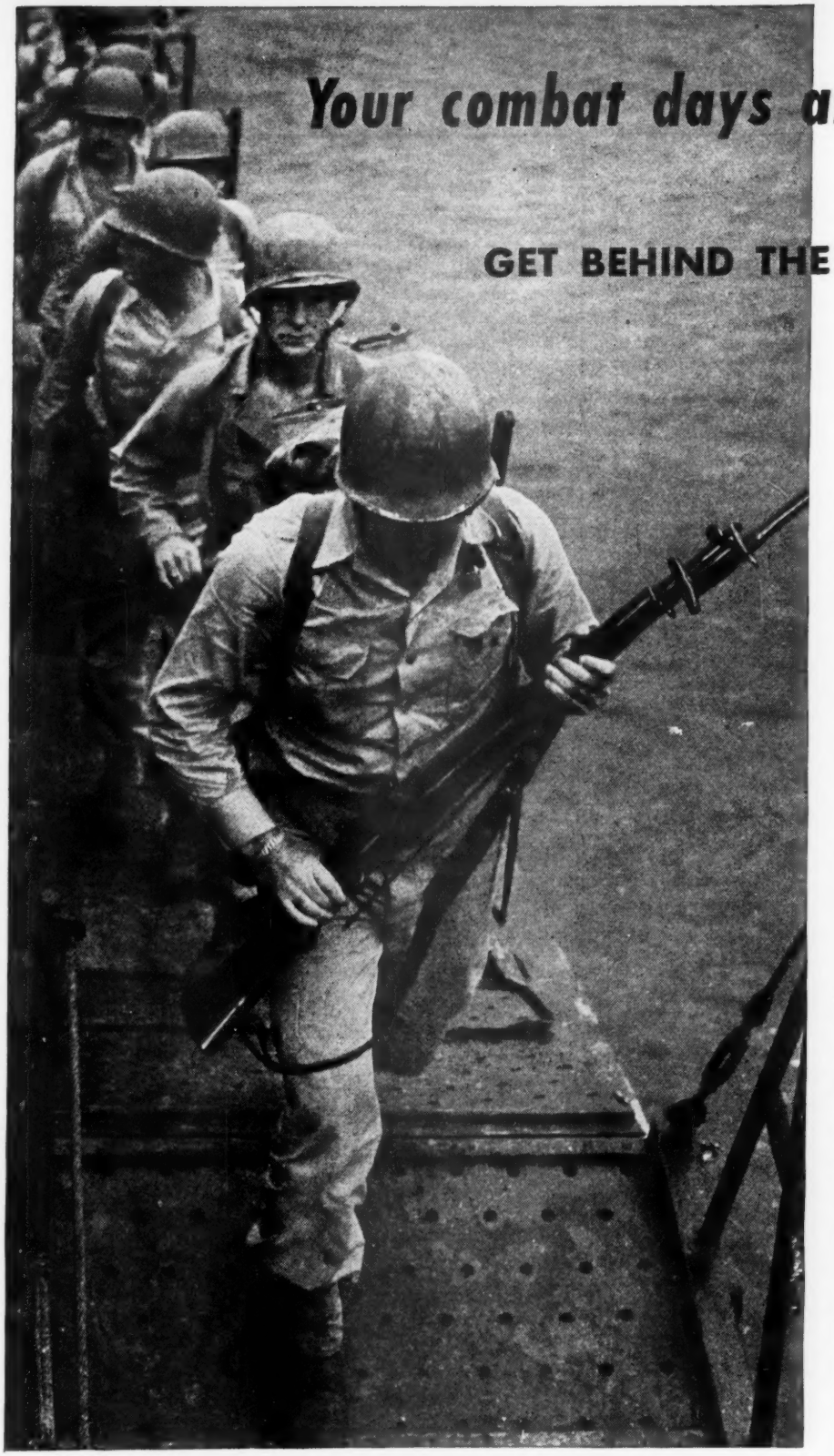
Zircon
Foote Mineral Co.
Hommel, O., Co., Inc.
Metal & Thermit Co.
Orefraction, Inc.
Titanium Alloy Mfg. Co.

Zirconium Oxide
Foote Mineral Co.
Hommel, O., Co., Inc.
Metal & Thermit Corp.
Orefraction, Inc.
Titanium Alloy Mfg. Co.
Vitro Mfg. Co.

Zircon Refractories
Corhart Refractories Co.
Remmey, Richard C., Son Co.
Titanium Alloy Mfg. Co.

Zirconium Silicate
Foote Mineral Co.
Hommel, O., Co., Inc.
Metal & Thermit Corp.
Orefraction, Inc.
Titanium Alloy Mfg. Co.

Zirkite (Natural ZrO_2)
Foote Mineral Co.
Hommel, O., Co., Inc.



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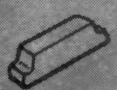
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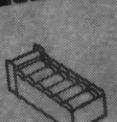
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